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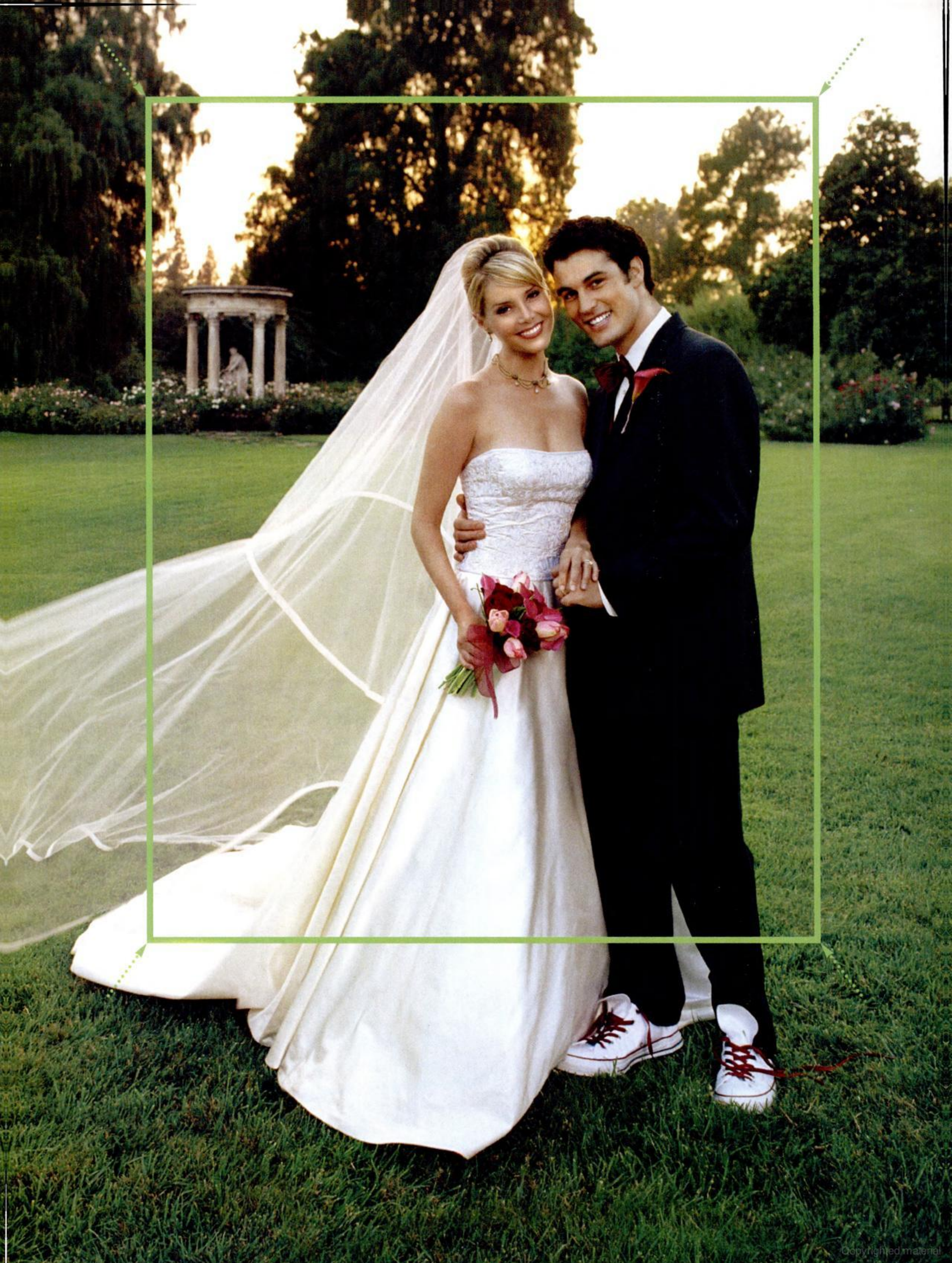
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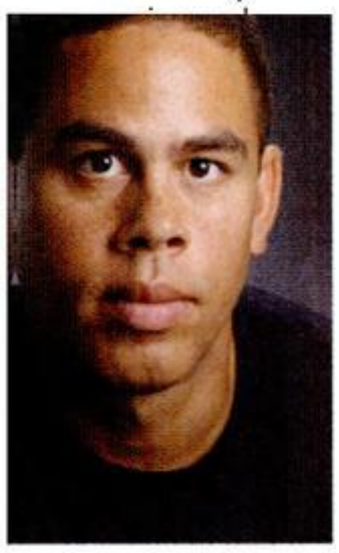

Release Notes

But First, a Little History

On the second page of our second annual Softy awards, we describe Microsoft's *Windows PowerToys* as a "gateway drug" to the *Maximum PC* ethos of PC upgrading, tweaking, optimizing, and hacking. This notion got me thinking about the roots of my own PC preoccupation: the Commodore VIC-20.

In 1982, my parents gave me Commodore's 6502-based 1MHz, 5K system (the first PC to sell one million units) and I quickly fell in love. It's hard to articulate why I get a tingle anytime I'm near an electronic or digital device, but I do know this: It started with the VIC-20. For an odd-looking mixed-race kid growing up in Inglewood, California at the height of this nation's obsession with and panic over nuclear war, the computer was a logical, insular, and occasionally puzzle-like object I could consume myself with.

In no time, I was programming BASIC and playing crude games, but that wasn't enough for me. I wanted to understand how computers work so that I could make them work better. I read magazines like *Ahoy, Compute! Gazette,* and *Home Computing,* which taught me how to hack into memory to change the display colors and opening message. This produced a two-week euphoria, but soon the system's plodding tape drive and limited memory made me feel s-l-o-w. So began the first of my many obsessive hunts for faster data throughput ad more processing power. I rigorously devoured the same magazines in search of opinions and options. Unfortunately, because I was just 10 years old, my options were limited to begging Mom and Dad for a new PC. Seeing as they had just bought me the aforementioned VIC-20, this request was summarily rejected.

So I made do. I became intrigued by the VIC-20's innards, a curiosity that painfully taught me the first rule of PC tinkering: Unplug the computer before sticking your hands into its guts. Darwin's ghost gave me a break on that one; I only received a minor shock.

Two years later, on the eve of entering high school, my VIC-20 was replaced by a Commodore 64. My obsession was in full bloom by that point. Almost immediately after receiving the C64 I decided to upgrade the Commodore's 1541 disk drive. Three minutes to load a game? Preposterous! Especially when third-party options existed that ran four times as fast. Unfortunately the brand-new Serial drive I replaced the 1540 with wasn't entirely compatible with the rest of the PC, which taught me a lesson I guess I still haven't entirely come to terms with: Fast plus new does not always equal compatible.

But when it comes to computers, fast, just like new, really makes me happy, which is part of the motivation behind our massive technology preview on page 26.

I'm curious—what got you hooked? Drop me a line and I'll publish a few of your responses next month.

—GEORGE JONES

george@maximumpc.com

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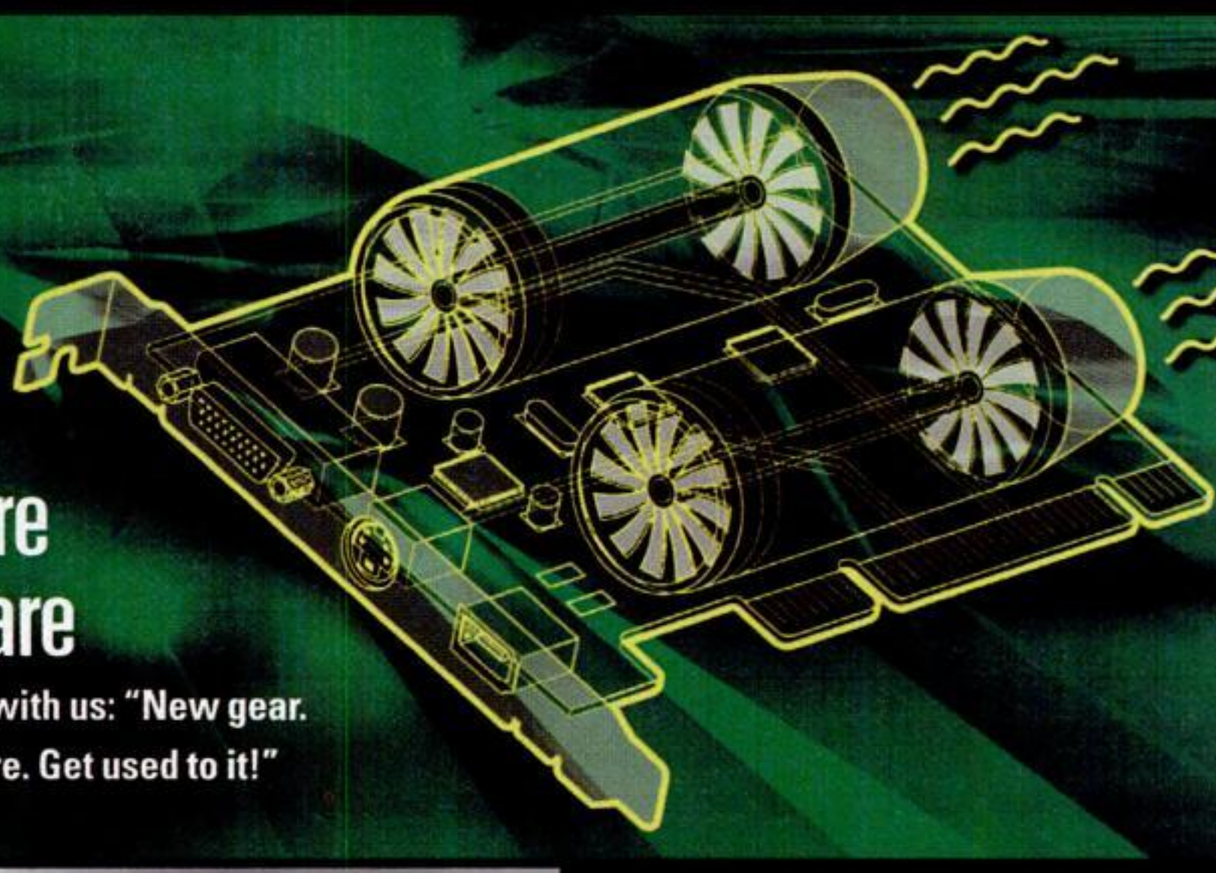

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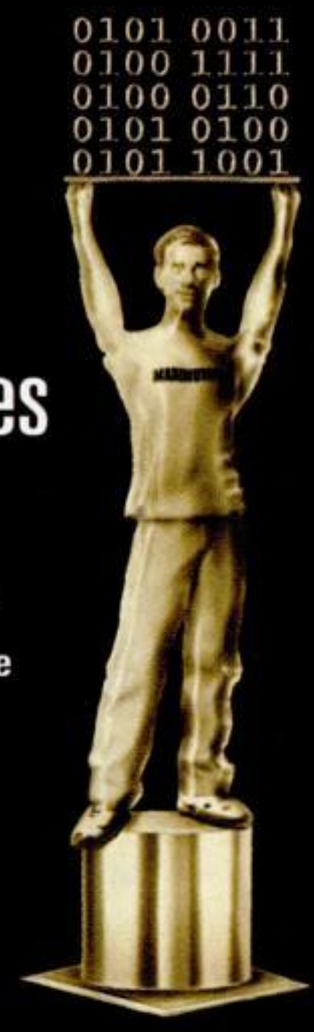

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In/Out

You write, we respond

AMD 64-FX WON'T WORK WITH OPTERON MOBOS?

Hey, guys, great magazine! In the "AMD's 64-Bit Gamble" article in the Nov. '03 issue. You say that due to "...chip surgery, BIOS incompatibilities, and a lack of cache coherency..." the AMD 64 FX won't work in Opteron mobos. Really? I read elsewhere that, with a simple BIOS update, the 64-FX will work in all Opteron mobos. What gives? Who's right? You guys are pretty reliable, but so is the other source.

—JASON MAYER

SENIOR EDITOR GORDON MAH UNG RESPONDS: Actually, we said the Athlon 64 FX will not work in Opteron boards in multiprocessor configurations. AMD says it disabled some of the HyperTransport links. An Opteron 144 or 146 has three functional HyperTransport links, while the 64 FX has only one. On boards that use the additional links, the Athlon 64 FX would give you problems. (These additional links would be used for other high-speed I/Os such as PCI Express or PCI-X.)

Is it possible that a BIOS update on a Opteron motherboard could enable the two dead HyperTransport links in the Athlon 64 FX? We doubt it. AMD says the links are cut off at the factory and cannot be enabled. This is all pretty academic, however, as most Opteron boards don't use the additional links. Just so you know, the first Athlon 64 FX systems sent to the press came with motherboard manuals that said the boards were made for only the Opteron 144.

WHERE HAVE ALL THE DUAL-GPU CARDS GONE?

It's been a while since I've seen any dual-GPU videocards on the market. Can you tell me why? And, more importantly, will any be released in the near future?

—BRIAN CARMIEN

TECHNICAL EDITOR WILL SMITH RESPONDS: Dual-GPU videocards went out of fashion for two simple reasons: They were too expensive and they didn't perform as well as they should have. I wouldn't expect to see any dual Radeon or GeForce FX videocards anytime soon. These chips are already massive—some have more than 100 million transistors—and difficult to cool. Adding a second GPU would more than double the cost of a top-of-the-line board.

MOBO MADNESS

Hey, guys, I'm always in the market for new upgrades. Unfortunately my lottery numbers never hit, so I'm always on a budget. I've busted the bank for high-end parts and now I've got the itch to do it again. After dreaming about your Dream Machine '03 [September 2003], I've decided to stay with an AMD chip, but I really want SATA and dual-channel DDR. Could you suggest a mobo for me?

—MITNKR60

SENIOR EDITOR GORDON UNG WRITES: It depends on whether you want Athlon 64, Athlon 64 FX, or Athlon XP. For Athlon XP, we still like Asus' A7N8X Deluxe (rev 2.0) boards. For Athlon 64 or Athlon 64 FX, we'd probably wait another month until the dust settles in the classic nVidia vs. VIA debate.

UH, LET US CHECK... NO

In response to "Three's a Crowd" [December 2003], how could you use an nForce3 motherboard with the Athlon 64 FX-51?! There are known issues with that board. This invalidates the whole competition. You need to repeat with a VIA chipset... or are you on Intel's payroll?

—ROBERT PATE

SENIOR EDITOR GORDON MAH UNG RESPONDS: The VIA chipset was not around when we did our showdown. We have it now, but nVidia has already said the issue with AGP performance only affects pseudo-synthetic tests, specifically *Viewperf 7.0*. As we discussed in the November issue, VIA boards/chipsets have been reported to be faster by a few percentage points in some 3D tests because of VIA's faster HyperTransport link. Look to our March issue for the definitive answer on production boards. One final note: 99 percent of our tests were CPU-limited and not AGP intensive, so I doubt this would have made any difference in our story.

AYE, BUT HOW FAR CAN YE PUSH HER?

I adore your magazine—it gives me reason to live! Knowing that SATA is out and in full effect, how far (storage wise) will EIDE go until it's abandoned completely? I know that Maxtor is out with a 300GB model. Are they going to continue with it?

—EDDIE RAMOS

DISC PRODUCER JOSH NOREM REPLIES: There are essentially two factors involved in the longevity of parallel ATA. First, it depends on how quickly drive manufacturers migrate from parallel ATA to Serial ATA (SATA). We're seeing this happen now with high-end hard drives, but the majority of drives (including optical drives) have yet to adopt the technology, and probably won't until Serial ATA is offered in a native format on the majority of motherboards.

This brings us to the second consideration: Adoption can only occur when motherboard chipset manufacturers begin to offer SATA support as a standard feature—like ATA cables or PCI slots. It all amounts to a chicken/egg scenario. Motherboard makers won't put SATA onboard unless there's an installed base, yet consumers are waiting for motherboard support before upgrading.

We anticipate that drive mak-

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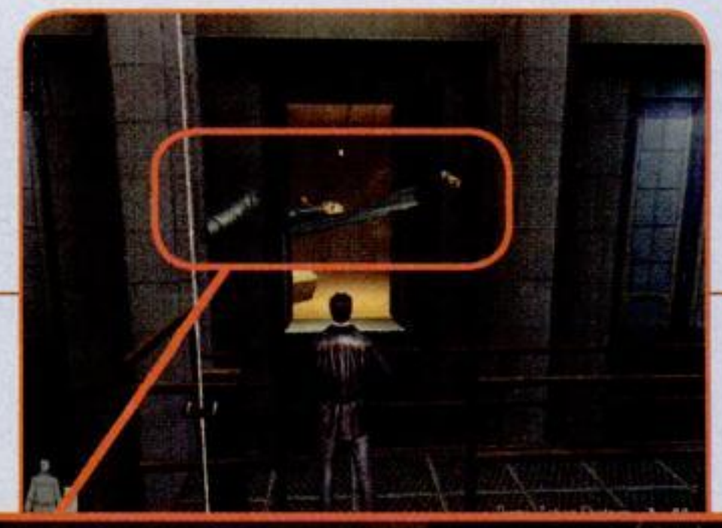

Check out this *Max Payne 2* screenshot. The bastard wouldn't tell me what I needed to know so I had to result to torture. Unfortunately, just like the first game, *Max Payne 2* was too damned short.

—ERIC KRAUSE

EDITOR IN CHIEF GEORGE JONES RESPONDS: Um, thanks, Eric. For our take on *Max Payne 2*, turn to page 93. While reviewer Josh Norem used slightly different tactics to extract information from the game's bad guys, he came to a similar conclusion: *Max Payne 2* is too damned short.

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ers and chipset manufacturers will meet in the middle and make a big push toward SATA adoption in 2004, even though parallel ATA products will be offered alongside their SATA counterparts. By 2005, however, parallel ATA will fall away while SATA steps to the forefront. Eventually, SATA will become the only interface option for desktop storage products, with legacy parallel ATA products requiring a SATA to PATA bridge. By 2006 we expect to see parallel ATA disappear from the face of the earth altogether. Then again, we could be wrong.

> *"RUNNING CABLES IN DUCTS WHILE THE HEATER IS ON COULD CAUSE THE CABLES TO MELT AND SHORT OUT."*

DEPARTMENT OF CLARIFICATION

I want to clarify Bob Somers' comments in December's In/Out section. I can appreciate his dedication to *Maximum PC* magazine by bringing it along on his trek up Mt. Whitney. However, Mt. Whitney is the tallest summit in the lower 48 states and *not* the tallest in the U.S., as Somers reported. The tallest mountain in the U.S.would be Mt. McKinley (20,320). Mt. McKinley is located in Denali National Park in Alaska.

—BILL CONNOLLY

HEATER DUCTS AND CABLES, PART 3

In the November issue, David Ferris stated that Plenum Cat-5 cable was safe to put in ducts. Well, CAT-5 CABLE DOES NOT GO IN HEATER DUCTS!!! It does not matter whether it has a Plenum rating or not. Plenum rating just means that it will not give off hazardous fumes when burned. It does not signify a higher melting or kindling point. Plenum cable is a building code requirement in most new office buildings. Running cables in ducts while the heater is on could cause the cables to melt and short out, or worse, catch fire and burn your place down.

—TYLER D. DAIGLE

WHAT TO DO, WHAT TO DO

I have a 2-year-old Dell 8200 with a 2.2GHz P4 Northwood CPU and 512MB of RAM. I was thinking about upgrading the CPU to give it a little kick, but according to my research, the mobo in this thing is stuck at 400MHz FSB. Which means the best I can do as far as upgrading the CPU is a 2.6GHz P4. Do you think a 400MHz clock speed boost is worth $200? Or would I be better off doubling the RAM? (It's RDRAM, so it's expensive.) Or should I just save my money, wait another six to eight months, and buy a brand-new PC? If it makes a difference, I use my PC mostly for video editing and DVD authoring, not really for gaming, so I'm mostly looking for faster transcoding to MPEG-2 and Divx.

—DAN HADDIX

SENIOR EDITOR GORDON MAH UNG RESPONDS: I don't think it's really worth the $200 for a 400MHz clock speed jump for gaming purposes. You'll get more performance from buying a more modern videocard. For video editing, you may actually get more of a kick from upgrading your software. If you, for example, use *Premiere 6.5* or earlier, the performance is plain horrible on the Pentium 4. Buy the new *Premiere Pro,* though, and you'll see more pep on the P4 from the new redesigned core in the application. The RAM idea also makes more sense. Because your box can use only PC800 RDRAM, it should only cost you about $85 to add another 512MB of RAM.

Another possible upgrade is to the Celeron. Intel just introduced its Socket 478 Celeron at 2.8GHz. We'd guess that 3GHz is probably just three or four months away. Because the Celeron operates on a 400MHz bus, it may drop right into your Dell and run at the higher clock speeds. Keep in mind that you'll be losing some cache (128KB in the Cellie vs. 512KB in the Northwood), but the 800MHz boost from a 3.0 version may be worth it.

MAXIMUM PC = FORTIFIED MINDS... KIND OF

I love how your magazine always gives me interesting facts about hippopotamuses. I'm going to go find me a hippo and prove your theory right now. Thanks, Max PC!

—ENDLESS FAN

CUT, COPY, PASTE

➤ *Bootvis* (December 2003, page 84) is no longer available for download from Microsoft's web site. Enterprising users can still find a version that works with Service Pack 1 by searching Google.

➤ In "Good Tidings and Happy New Gear" (December 2003), the Muvo NX capacities are listed in GB instead of MB. Also in that story, we dropped some text... along with the Maxtor URL. It's www.maxtor.com. And the APC TravelPower Case we featured is not $35, but $130.

➤ In our ATI Radeon 9800 XT review on page 100 of the December 2003 issue, we used the wrong photograph, showing the 9600 Pro instead of the 9800 XT. Also in that review, the story says that the Radeon 9800 and Radeon 9700 are based on the R300 core. This is incorrect. The 9800 is based on the R350 core, which is an enhanced R300 core.

➤ In our Microsoft Wireless Desktop Elite review on page 111 of the December issue, we mistakenly paired Microsoft's keyboard with Gyration's Ultra GT Cordless Optical Mouse. D'oh!

COMING NEXT MONTH IN THE *TASTES-LIKE-HOMEMADE* FEBRUARY ISSUE OF *MAXIMUM PC*

WINDOWS XP PERFECTED

Tips, hacks, and tweaks for fine-tuning your PC to perfection. Includes countless shocking time-saving tasks for MS *Word, Outlook, Internet Explorer,* and *Windows Media Player*!

KNOW YOUR PC RIGHTS REDUX

Unless sharing a cell at Club Fed with a brawny dude who calls you "toots" is your scene, you'd best check out our second Know Your PC Rights feature, where we consult the experts on the legal issues facing PC users, file traders, and Internet slummers.

HOW-TO: SAFELY INSTALL LINUX ON YOUR WINDOWS MACHINE

Installing Linux is easier than ever, if you follow the Maximum PC Method.

PLUS!

The PC Plug and Connector Reference. Collect 'em all!

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*All claims based on Xbox version of the game according to Gamestandings.com on 9/09/03

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BOB AND SPARKY'S PRIME TIME

7:00 pm	7:30 pm	8:00 pm	9:00 pm
Digital Music Download "Yellow Dog Blues"	**TV** Watch last week's "Underdog" marathon	**Digital Photos** Upload Westminster Kennel Club Dog Show Pics & Video	**Web** Surf Kennel Club Web Board
News	**Sitcom**	**Reality Sh**	**Sporting Event**

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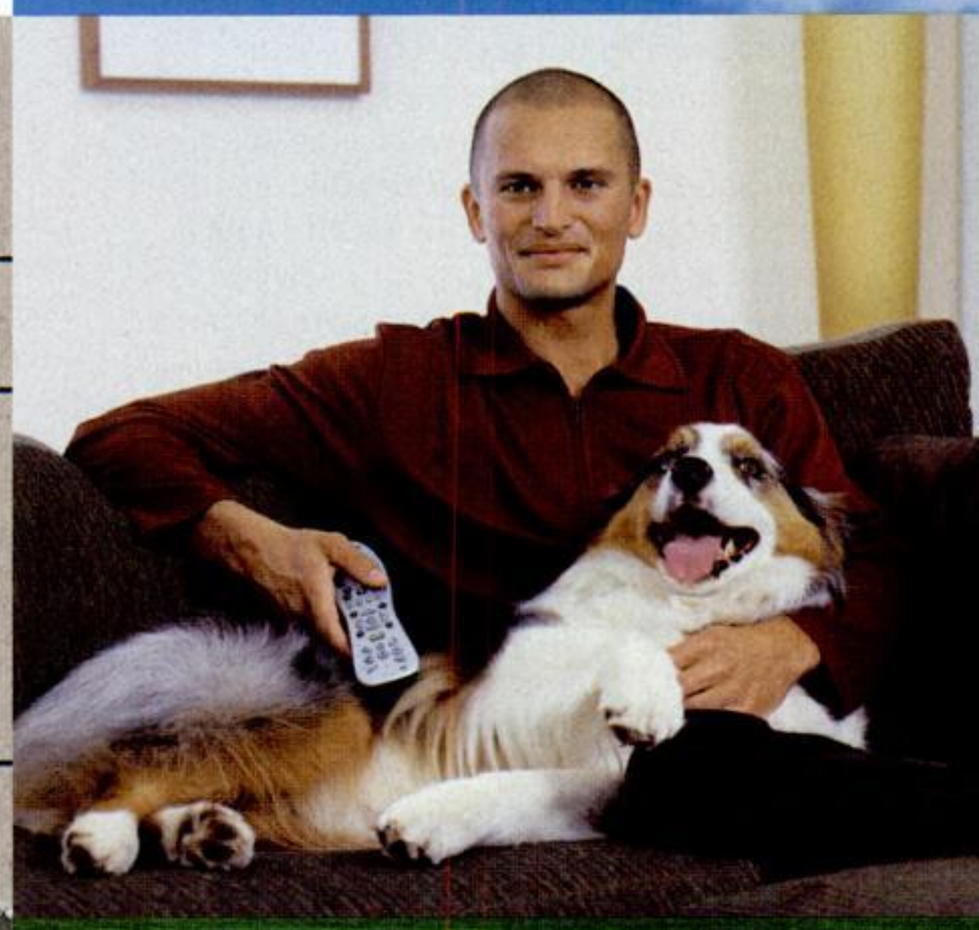

9:30 pm	10:05 pm	10:30 pm
DVD View "The New Adventures of Lassie"	**E-mail** Invite Sue & Fluffy to dog park tomorrow	**Radio** Chill to 'Dog Talk' on WOOF-FM

News News

Entertainment that tunes into you.

With a Windows® XP Media Center Edition PC, the programming schedule revolves around you. Pause, rewind, and digitally record your favorite TV shows. Watch your DVDs. Download, upload, and make your own music mixes, videos, and digital slideshows. The Media Center remote control lets you do it all from your favorite spot on the couch. Because it's a full Windows XP-based PC, it can also deliver your e-mail and the Web.* To experience entertainment your way, visit **microsoft.com/mediacenter** or your nearest retail store.

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Quick Start

The beginning of the magazine, where articles are small

Wee PCs

The *real* pocket PCs are coming

The Antelope Modular Computing Core in repose. Drop it into a dock and it becomes...

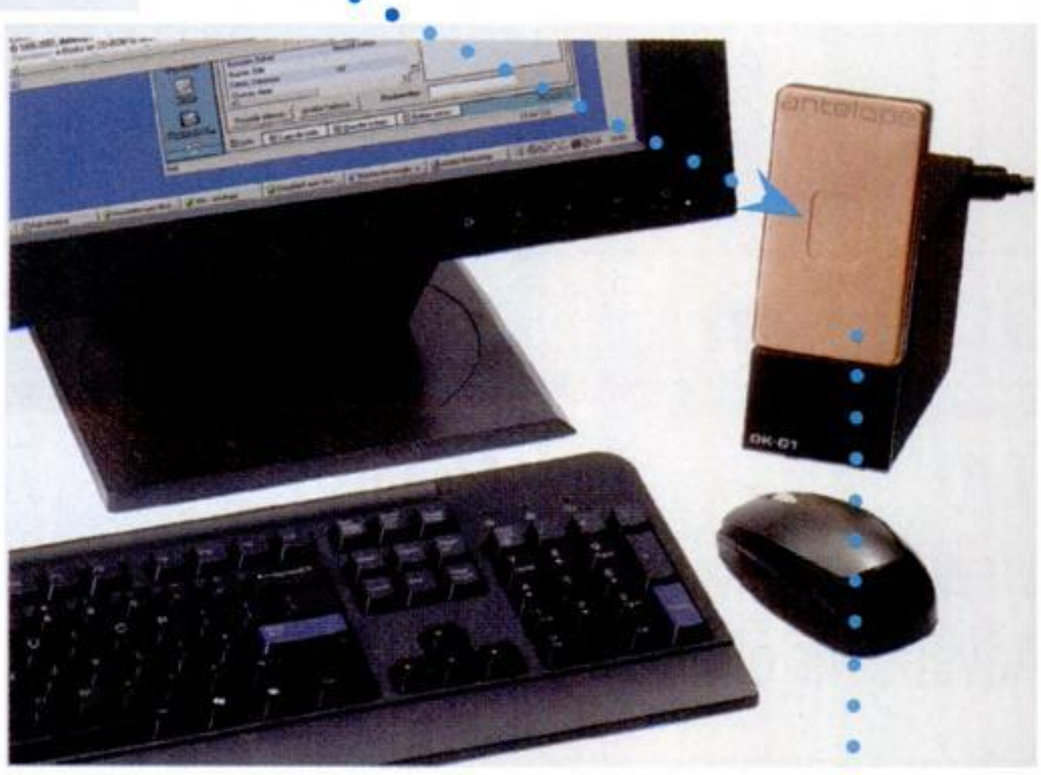
You've got your lumpy desktop system at home, a sleek laptop for travel, and a PDA for short hops in between. But as you move forward on the electronic food chain towards greater portability, you sacrifice power and flexibility at every step. And you take on the added expense of owning multiple devices, some of which have redundant software licenses. Is this really necessary? Antelope Technologies (**www.antelopetech.com**) doesn't think so. The Colorado-based company is the first to offer a pocket-size PC—the Antelope Modular Computing Platform—running Windows XP Pro.

It all starts with the Antelope's Modular Computing Core (MCC), which packs a 1GHz Transmeta Crusoe 5800 processor, a 15GB hard drive, 256MB RAM, and an 8MB 3D graphics chipset. Amazingly, all this weighs only a little more than 9 ounces. On its own, the 3x5x.75-inch MCC just sits there looking pretty. But a proprietary connector that resembles a PalmPilot cradle adds VGA, stereo-out, line-in, a Cardbus slot, and three USB 1.1 ports to the mix when the MMC is docked.

The best part is that when the SEC raids your office, all you have to do is pull out the MCC, slap it into Antelope's rugged handheld shell, and slip out the back door. Now you've got all your corporate secrets in a portable device with a 6.3-inch, 1024x768, backlit active-matrix touch screen that weighs less than 14 ounces. If only Frank Quattrone had known.

Not to be left out, OQO (**www.oqo.com**) has a mini-PC of its own in the making, named the UPC, for "ultra-personal computer." Like the Antelope, the UPC runs Windows XP Professional on a 1GHz Transmeta Crusoe 5800 proc and 256MB RAM. But OQO is upping the ante in several other areas: a 20GB hard drive; a built-in display and a 3D chipset that supports up to 1280x1024 resolution; and both 802.11b and Bluetooth connectivity. Plus, the OQO will offer a "media mode" that converts the UPC into a portable MP3 or movie player. It all sounds well and good, but OQO has delayed the release of its UPC for more than a year, while Antelope is shipping the MCC now, at $3,970 for a package that includes the core, the handheld shell, the desktop docking station, and oodles of accessories.

Now that CPUs are shrinking to the size of a dandruff flake and tiny, quarter-size hard drives are holding upwards of 40GB, you can expect to see more of these wee PCs sticking out of the pockets of cutting-edge tech heads and white collar criminals everywhere. Rest assured that *Maximum PC* will be putting some of these futuristic devices through their paces in an upcoming issue.



...the Antelope desktop PC. Now slide the MCC into the portable shell and you've got...

...the Antelope handheld. Makes you want to put on some antlers and start head-butting, doesn't it?

OQO's Ultra Personal Computer will include a built-in display and pen-based digitizer.

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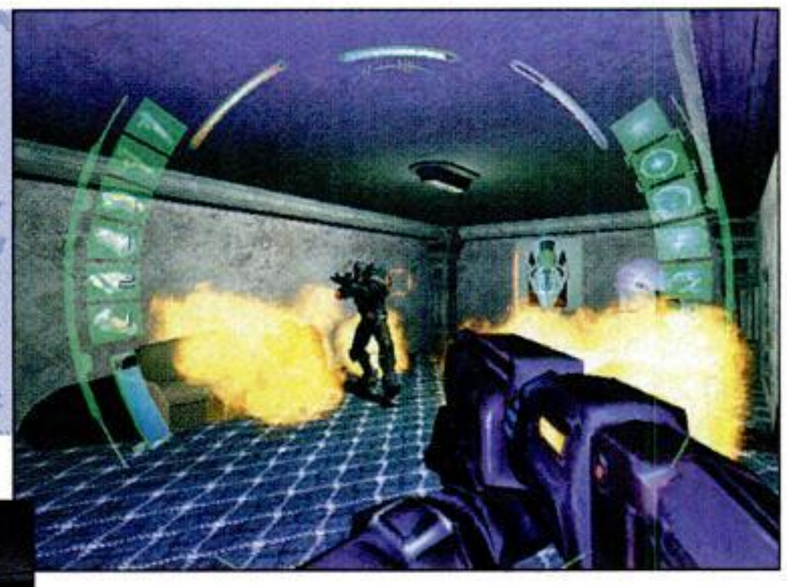
Looking to Break in That Fancy New Videocard?

DirectX 9 games arrive just in time for the holidays

Don't be embarrassed that you bought a new Radeon 9800 Pro or GeForce FX 5900 Ultra for *Half-Life 2*. Heck, even we thought Valve would deliver the goods. But even without *Half-Life 2* this holiday season, plenty of opportunities exist for you to use your shiny new card's programmable shaders. These four games are all available now, and each takes advantage of either advanced Pixel Shader 2.0 or older Pixel Shader 1.x hardware. And they should be good games, too!

Deus Ex: Invisible War

Ion Storms' dystopian RPG/first-person shooter hybrid offers amazing dynamic lighting, cinematic camera effects, and bump-mapped everything.

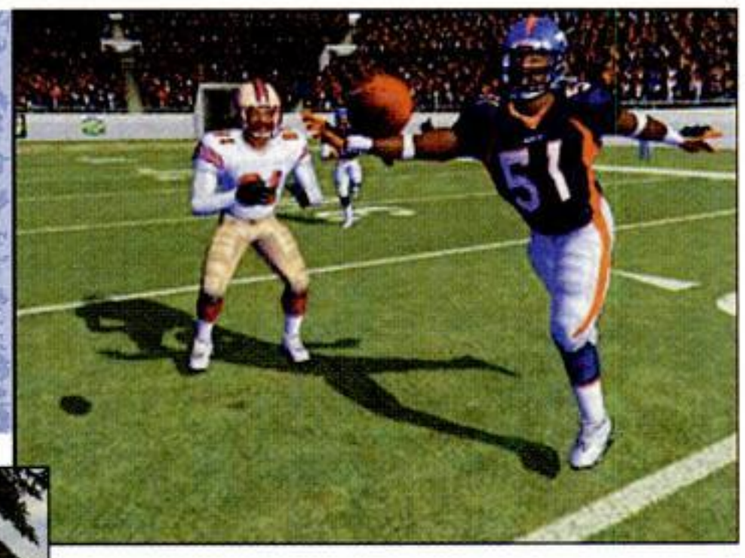


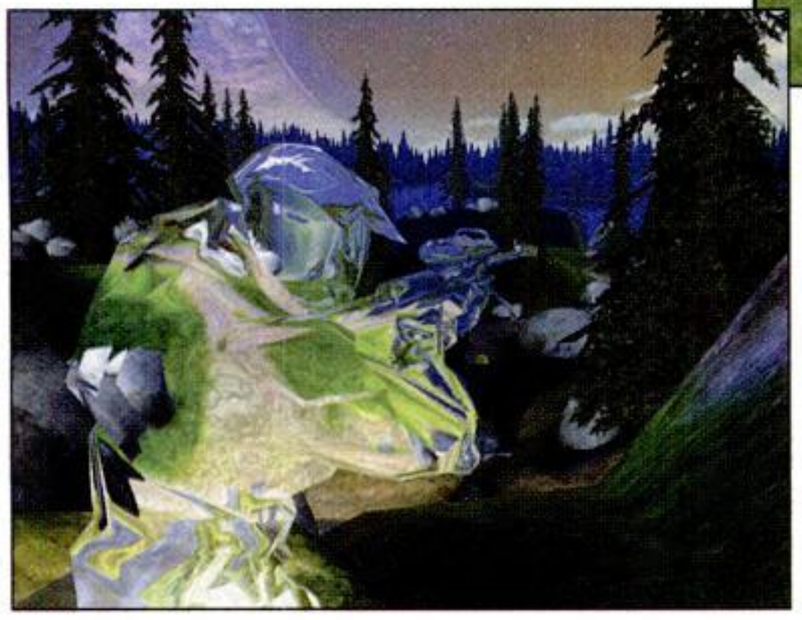
Knights of the Old Republic

In this epic 3D RPG set 4,000 years before the Star Wars movies, you skip around amidst fields of grass meticulously rendered by your card's vertex shaders. Your lightsaber's pixel-shaded glow will give you much glee.

Madden 2004

Not only is it the best football game ever, *Madden 2004* also uses programmable shaders for everything from the life-like grass on the field to the reflective visors the cornerbacks wear. Exceptional work!





Halo PC

Every surface in this sprawling first-person shooter is bump mapped and every weapon casts dynamic lights. You'll even see some cinematic effects—like depth-of-focus changes—as you play.

Also check out XIII, Tron 2.0, and Savage for more fancy videocard footwork

ALT.OPINION.RANTS BY JON PHILLIPS

Why I Approve of L's Audacity

Know who I'd hate to be? I'd hate to be the person in charge of L Computers' web site (www.go-l.com). Imagine all the trademark symbols that have to be coded in. PuRAM™. Super-BIOS™. CacheFlow™. Every time one of these curious terms appears, a trademark symbol follows. And that's a lot of busy work. I know because I just finagled three of the little buggers into this column for illustrative purposes. Trust me, folks, I never plan to hit those keystrokes again.

Then there's the matter of the company's name. In this magazine, we signify it with the letter L—and not for the sake of brevity, but because our font sets don't include the pictograph that the PC manufacturer uses to represent its name. Is it a lowercase, cursive L? Some type of Latin notation? I don't know. But I do know that I wouldn't have the patience to insert a special character into my HTML document every time I needed to spell Maximum PC.

L Computers: A cutting-edge hardware manufacturer, or The Vendor Formerly Known As Lieberman Inc? That question is addressed on page 38 of this issue, so in this space, I'll simply rant on what L's grandiose presentation means to hardcore PC nuts.

For I have come to praise L Computers, not to bury it.

Dig: During the last six weeks, *Maximum PC* has received an avalanche of requests asking for a review of L's new 3.8 desktop rig. I personally have never seen such interest in an OEM machine during my entire tenure at the magazine. And only a very small percentage of readers sent us words to the effect of, "Please expose this company for the sham it is." No, the response has been overwhelmingly enthusiastic. You guys want to believe. You want L Computers to fulfill the promise of all its proprietary-sounding buzzwords.

And that's why L deserves some credit. Sure, terms like "Super-BIOS" do reek of Apple-style hyperbole (the Mac's "Velocity Engine," after all, is just a fancy descriptor for a SIMD instruction set). But by announcing its new hardware with such celebration, and by promising such over-engineered technology, L is in effect saying, "Hey, it's OK to want ungodly levels of performance—and we are here to deliver the goods."

Now, it remains to be seen whether PuRAM, Super-BIOS, and CacheFlow truly warrant their fancy names and trademark symbols. But I'm sure glad that an OEM is taking the time to celebrate its own innovation so aggressively, because such grandstanding stokes the flames of competition. The forward march of technology thrives on conflict, and I'll be one very unhappy PC enthusiast if I ever have to live in a world that accepts the status quo.

Jon Phillips was formerly editor-in-chief of Maximum PC, *and now serves as the magazine's editorial director.*

SCO vs. the World

A quote-by-quote analysis of SCO's epic quest to sue everyone, everywhere

Unix vendor The SCO Group (SCO), formerly known as "Linux For Business" vendor Caldera Systems, recently sued IBM users for $3 billion dollars, claiming IBM improperly put SCO-controlled Unix code into Linux. On these grounds, SCO has implied legal action against countless Linux users unless they cough up license fees. Does SCO have a legitimate beef, or is this the last gasp of a floundering company? Let's look at the arguments.

SCO SAYS:

"Linux contained SCO's UNIX System V source code... Linux was an unauthorized derivative of UNIX. SCO intends to use every means possible to protect the company's UNIX source code and to enforce its copyrights."

SCO Grand Poobah Darl McBride

SCO ARGUES:

"We have been educating end users on the risks of running an operating system that is an unauthorized derivative of Unix." Oh, and by the way, "Be advised that our response will likely include counterclaims for copyright infringement and conspiracy."

SCO SAYS:

The GNU Public License, the cornerstone of a ton of open source in general and Linux in particular, runs counter to the U.S. Constitution and is "unenforceable, void, or voidable. SCO believes that the GPL—created by the Free Software Foundation to supplant current U.S. copyright laws—is a shaky foundation on which to build a legal case."

SCO SAYS:

"While using pirated software is copyright infringement, our first choice in helping Linux customers is to give them an option that will not disrupt their IT infrastructures. We intend to provide them with choices to help them run Linux in a legal and fully-paid-for way."

IBM REBUTS:

"SCO is asking customers to pay money based on pure unsubstantiated threats, without offering any facts. SCO has infringed and is infringing on IBM's copyrights by copying, modifying, sublicensing and/or distributing Linux products except as expressly provided under the [GNU Public License] GPL."

IBM Head Honcho Sam Palmisano

RED HAT SAYS:

"SCO's campaign is designed to both slow the growth of Linux and to reverse its failing fortunes by convincing Linux users they need to pay SCO a license fee to use the lower-cost Linux operating system." (Subsequently, Red Hat sues SCO shortly after SCO sues IBM.)

Red Hat Big Cheese Matthew Szulik

FORMER CALDERA/SCO CEO RANSOM LOVE REBUFFS:

"I wouldn't want to test the GPL in court, particularly given Caldera's history of voluntary compliance with it."

The Penguin

MAXIMUM PC SAYS:

After they stop laughing, IBM, Red Hat, and just about everyone else in the Linux business should pay SCO absolutely nothing.

▶▶ FAST FORWARD BY TOM R. HALFHILL

Your Processor Needs A Plumber

Leaks are a drag, whether they involve a dripping faucet, a CPU liquid-cooling system, or an embarrassing secret at the White House. Another kind of leak that bothers electrical engineers is now seeping into the public mind: current leakage in microprocessors.

Lately I've been reading all kinds of ridiculous descriptions of current leakage. Example: "Microprocessor chips can leak power even when they're off." Not exactly. If there isn't any power going into a chip, then the chip can't leak any power. Otherwise, it wouldn't be a chip—it would be a battery.

So what is current leakage, and why are more and more people beyond the engineering community worrying about it? Briefly, current leakage is electricity that escapes from the conductive elements in a circuit. It's like a faucet that drips water even when it's supposed to be off. This is a growing problem with the latest processors, which are so leaky that it's getting harder to keep them cool. In years past, the only significant power drain from a processor was active power: the electricity consumed when the transistors are switched on. Now, engineers are alarmed by rising inactive power: the electricity consumed by transistors when they're supposedly switched off.

Transistors are leaking more power in their "off" state because they're getting smaller with each advance in chip-fabrication technology. When you hear that a processor is made in a 0.13-micron fabrication process instead of a 0.18-micron process, that means the transistors are about 50 percent smaller. As everything gets smaller, including the insulating layers around the transistor's gate, channel, and junctions these conductive elements leak more power, which is dissipated as heat.

That trend would be bad enough, but two additional factors worsen the problem: Newer processors have millions more transistors, and the processors' core voltage keeps dropping. Although a processor with more transistors can have a more sophisticated design and larger caches, it also has more places that can leak current. And although lower voltages help reduce active power consumption, a side effect is greater inactive power consumption.

Some of the confusion over chips leaking power while they're off exists because a chip can appear to be off even when it isn't. In sleep mode, a processor shuts down most of its circuits but still draws a trickle of power. Your notebook PC or cell phone may seem to be off, but if the chips are merely sleeping, they're leaking power and draining the battery.

All chipmakers are flogging their engineers to solve this problem, and some interesting technologies are beginning to emerge. Meanwhile, the stopgap solutions are bigger heatsinks, more fans, better case designs, and liquid-cooling systems.

Tom Halfhill was formerly a senior editor for Byte *magazine and now an analyst for* Microprocessor Report.

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'Tis Still the Season

Save your holiday with retail therapy

It totally sucks when you don't get anything you like for the holidays. We here at *Maximum PC* call it Post-Acquisition Disappointment Syndrome (PADS), and if it happened to you this year, you have two options: Get over it, or go out and buy something for yourself. Here are three ways to save your fragile psyche during these delicate times.

Hercules' DJ Console is an instant party, allowing you to make your own music mixes. And, as an added bonus, its buttons are illuminated for nighttime use.

Hercules DJ Console

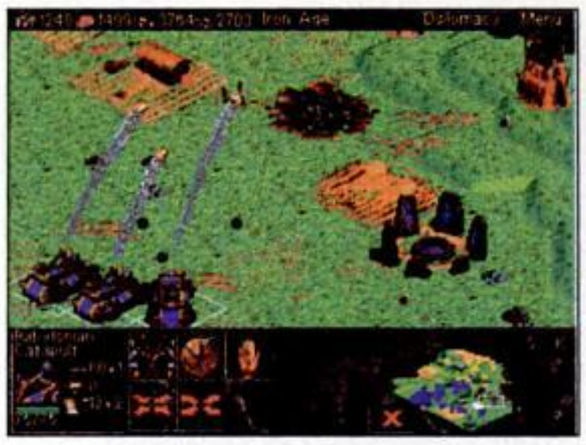
Yes, the once-mighty purveyor of videocards is back, and this time it's gunning for the ears, not the eyes. The DJ Console (**us.hercules.com**) puts you behind the virtual turntables, giving you no-talent-necessary access to mixing tracks (CD audio, MP3, or WMA files), beat-matching, and even simulated scratching via two onboard jog dials. The scratching primer's brief instructions are a can't-miss, teaching wannabe Grand Masters the "baby scratch" (*vzzzt, vzzzt*) as well as the "pass-pass" (*wunka-wunka*).

On its off hours, the DJ Console can also be used to control other audio software via the included control remapping software, and it can perform as a simple external soundcard with onboard 5.1 connectors.

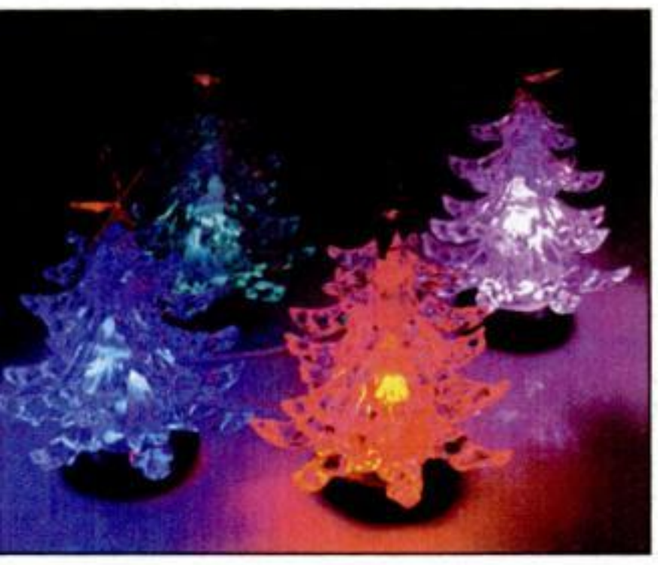
No price would be too much to pay to go from being a flaccid, uninteresting geek to a thrilling, groupie-humping fun maker, but luckily, the DJ Console can be had for just $250.

MDM Software Cards

The process of installing software on a Pocket PC is the kind of tedious chore most people associate with undocumented workers. And each application takes a bite out of your precious memory, which is a huge drag. That's why we welcome MDM's revival of cartridge culture. The company is producing hot-swappable SD cards that contain games and applications that automatically launch when you insert them. Appropriately enough, one of the first game cards MDM released was *Atari Retro*, a compilation of Atari 2600 classics ($30) including *Adventure, Missile Command,* and *Asteroids*. But more sophisticated fare, like the Pocket PC edition of *Age of Empires* ($30), is also available. You can also get reference books like the *Britannica Concise Encyclopedia* ($40) and a *Secure File PDA Backup* utility ($50) on SD cards.



MDM's SD card–based games are easy to use, and range from the delightfully light *Atari Retro* to the more intense *Age of Empires*.



Because joy isn't just for the holidays anymore.

USB Christmas Tree Light

For those of you who simply cannot let go, the USB Christmas Tree Light from Tomato Chip ($10, **www.tomatochip.com**) makes every day Christmas. It's a little bit of bus-powered cheer that changes color every second to keep your blues at bay. And if anyone gives you guff about the Christmas tree after the holidays, just say, "What have you got against trees?"

GAME THEORY BY THOMAS L. McDONALD

The Lessons of a Legacy

The original *Railroad Tycoon* sank one of the deepest wells in the history of computer gaming. Countless games that came later—from *Civilization* to the infinite variety of tycoon games—flow from Sid Meier's 1990 original, which blended elements of economics, building, strategy, and conquest into something new: a game of economic conquest. A MobyGames search of the word "tycoon" returns several dozen entries: games applying the tycoon format (buy low/sell high) to skiing, malls, airlines, cars, politics, and a host of other subjects. That doesn't even count all the other economic sims that owe a dept to Meier's original.

While Meier moved on to other subjects, his creation was kept alive by Phil Steinmeyer (*Heroes of Might and Magic, Tropico*) and PopTop games in a pair of *Railroad Tycoon* sequels. To Steinmeyer's eternal credit, he created sequels that expand upon and refine the original. Like *SimCity 4*, the new *Railroad Tycoon III* had only a few tasks on the design to-do list—new engine and visual perspectives, refined controls, and enhanced economic models—and it achieves them admirably, if not without controversy.

Some fans who know every tick and hiccup of the original games, and have ossified strategies to deal with them, resented having to learn some new tricks. The game actually has a smart new way of managing loads (particularly passengers), only moving profitable cargo. Each passenger has a destination, and if a train doesn't bring the passengers closer to that destination, they won't get on. Demand is tied to industry, not to train lines, creating a more subtle and complex supply/demand model.

While almost all of the changes are welcome, PopTop remains mired in its reliance on campaigns and scenarios with peculiar, rigid victory requirements. In short, there is too much focus on matching predetermined and arbitrary conditions for victory rather than in just growing a thriving and profitable empire. While *SimCity 4* shipped without scenarios, *RRT3* is dominated by them, with only the sandbox mode allowing a more free-range gameplay.

It's an interesting design issue that was already vexing author Orson Scott Card back in 1991. Game designers, he observed in an article for *Compute* (Feb. 1991), have "chosen to work with the most liberating of media, and yet they snatch back with their left hand the freedom they offered us with their right.... Every freedom that you can give to the player is an artistic victory. And every needless boundary in your game should feel to you like failure."

Thirteen years later, even the best designers are still figuring this out.

Tom McDonald has been covering games for countless magazines and newspapers for years. He lives in the New Jersey Pine Barrens.

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This jungle makes the Amazon seem like a botanical garden.

Dungeon Siege®
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TEEN
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PC CD-ROM SOFTWARE

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Microsoft game studios

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Head2Head

A showdown among natural PC competitors

THIS MONTH: Online Music Services!

You'd think that of all people, music executives would know how to *listen*. But the industry's response to the popularity of online music downloading was *Pressplay*, a joyless site so uptight that subscribers had to pay $15 a month for the privilege of burning a whopping 10 tracks to CD.

Luckily, such laughable stinginess is on its way out. Today, music downloading services are in fierce competition with each other, and the one that rises to the top will be the service that understands that the way we discover, acquire, and enjoy music is changing. This month, we compare four of the biggest downloading services, and we'll tell you which ones hit the mark, and which ones ought to go the way of *Pressplay*.

—LOGAN DECKER

ITUNES

Catalog: More than 400,000 songs from major record companies and independents. The catalog also includes loads of exclusive tracks (usually remixes, live, and acoustic sets). As a nice bonus, more than 5,000 audiobooks are also available through the service.

Sound quality: All songs and books are encoded in Apple's AAC format at 128Kbps. The result is better than MP3 at the same bitrate, but we found the sound slightly flatter than high or variable bitrate MP3.

Price: 99 cents per song. No subscription fee. All songs and audiobooks offer 30-second previews. Album prices vary, but beware of "partial albums" which, because of copyright issues, don't duplicate the contents of the original LP or CD. *iTunes* was the worst offender in this respect.

Policies: You can play purchased music on up to three PCs (it takes a single menu command to authorize and de-authorize those systems). CD burning is unlimited, but you can only burn the same playlist 10 times. *iTunes* syncs with Apple's iPod flawlessly, but if you own any other type of player, it must support AAC files, or you will have to convert the file on your own.

Features: *iTunes* has far and away the most convenient features of any service, such as gift certificates redeemable with a single click, and "allowances" that dump monthly sums charged to your credit card into separate accounts for your kids, step-kids, or pets. *iTunes* is a joy to explore and use, and songs can be purchased and downloaded with ease. Although networked PCs using *iTunes* instantly recognize and stream each other's music, we were surprised that *iTunes* lacks community-based features, such as user playlist sharing, beyond your own network.

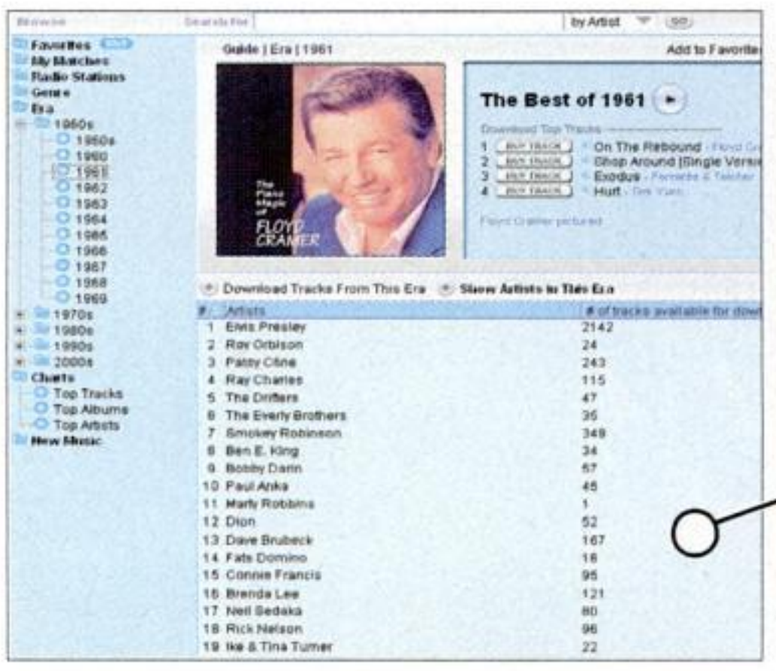
MAXIMUM PC VERDICT 8

www.itunes.com

MUSICMATCH DOWNLOADS

Catalog: More than 250,000 songs from major record companies and independents. When you select an artist to browse tracks, the service spits out all the tracks it offers in order of popularity, not alphabetically or by album. Freaky.

Sound quality: Music streams are encoded using Windows Media Audio at 160Kbps—the highest quality of the roundup. Unfortunately, the 30-second previews often sounded horrible.



Price: 99 cents per song. Albums cost $9.99 in general, but there are many exceptions.

Policies: The policies are as generous as *iTunes*. You can burn tracks and albums to CD, listen to your downloads on up to three PCs simultaneously, and burn the same playlist up to five times. However, you can only transfer tracks to portable devices that support secure Windows Media.

Features: *Musicmatch Downloads* is as butt-ugly as its name, resembling a first-generation, frame-crazy web page. Plenty of features are there, such as access to Internet radio stations (including "French Hits") and extensive artist and genre information; it's just that they're smothered beneath an ungainly interface. Like *Rhapsody*, *Musicmatch* offers information on tracks and artists not included in its own rather modest catalog.

MAXIMUM PC VERDICT 6

www.musicmatch.com

Copyrighted material

RHAPSODY

MAXIMUM PC KICK ASS PRODUCT

Catalog: More than 400,000 songs from major record companies and independents. *Rhapsody* also includes more than 50 Internet radio streams, as well as the ability to create your own custom station. While *Rhapsody* claims the same number of songs as *iTunes*, we found more music that we were looking for in just about every category—from jazz to classical to complaint rock—than with any other service.

Sound quality: Music streams are encoded using Windows Media Audio at 128Kbps, which sounds significantly better than MP3 at the same bitrate, but the service will soon transition to Real's proprietary format. Files downloaded for burning are converted from WMA to WAV, so there is some loss in quality as a result.

Price: $4.95 a month for the Radio Plus service, which gives you access to *Rhapsody's* radio streams. $9.95 a month buys you the All Access plan, which gives you unlimited streaming access to the entire *Rhapsody* catalog and the ability to burn tracks to CD for .79 each. Not all of the songs from *Rhapsody's* catalog are available for burning.

Policies: With the All Access plan, you can create and save playlists, but can play them only when you're connected. Once you burn a song to CD, however, it's yours to keep.

Features: *Rhapsody* isn't just a music downloading service—it's a generous resource, and that makes it exciting to use. For example, *Rhapsody* will give you information about records and artists that aren't even in its own catalog (whereas *iTunes* will leave you in the dark about recordings that it doesn't carry). You get links to artists' home pages, album mini-reviews, recommendations for similar artists, pointers to compilations and *Rhapsody* radio stations playing the artist you select, and of course, all-you-can-eat music streaming from a comprehensive and diverse catalog. Awesome.

MAXIMUM PC VERDICT **9**

www.listen.com

NAPSTER

Catalog: More than 500,000 songs from major record companies and independents—the largest catalog in our roundup, but with a strong pop slant.

Sound quality: Tracks are encoded with Windows Media Audio at 128Kbps.

Price: 99 cents per song. $9.95 per album. In order to keep the album price consistent, extended or double-length albums are simply unavailable for purchase—you have to purchase each track individually. And there isn't much information about the tracks you purchase; there's no way to tell, for instance, if you're buying live or studio tracks from Tori Amos' double-length *To Venus and Back* without first previewing them. $9.95 buys you unlimited downloading and streaming (at 96Kbps for the latter), but these tracks are playable only while your subscription is active, and aren't transferable to portable players.

Policies: Once you buy a track, you can burn it to CD and copy it to a maximum of three PCs simultaneously. *Napster 2.0* will only transfer files to Samsung's YP-910GS *Napster*-branded player, but you can manually transfer tracks to any player that supports secure Windows Media Audio.

Features: *Napster's* biggest strength is its community-based features. You can explore other members' libraries (and stream them with the Premium service), e-mail playlists to friends (who must subscribe to hear the songs), and even earmark a member whose collection you want to keep an eye on.

MAXIMUM PC VERDICT **8**

www.napster.com

THE UPSHOT

Apple's *iTunes*—both the application itself and the download service—will dazzle you with its elegance and ease of use. But music lovers will be far better served by a subscription service that encourages exploration and discovery. *Musicmatch* offers the best quality downloads, but the difference between it and the competition is only noticeable on the highest-end audio systems, and the *Musicmatch* catalog is weak. We appreciate *Napster 2.0's* huge catalog and attempt to offer a legal alternative to music "sharing" by promoting playlist and title sharing, but in the end, *Rhapsody* is the service we favor. You'll get the best (and some of the most obscure) tracks, a radio service that promotes exploration, and the option to buy and burn tracks at a fair price without guilty-before-proven-innocent policies. ■

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Cases pictured for S.P.U.G and Hysteria are anodized and available in black, blue, red and silver.
Case pictured for Panic Attack is available in brushed aluminum and black.

SCREAMWORX

It's not just a game anymore

WatchDog

Say hello to Leapin' Lily, WatchDog of the Month.

Maximum PC takes a bite out of bad gear

THIS MONTH: The WatchDog goes after...

>Apple >EZ-Inkjets.com >Belkin >Spam Scammers

Apple to Refund Unhappy G3 Owners

If you're unhappy with the sub-optimal performance of your Apple G3 with OS X, you have recourse. Apple Computers is close to settling a class-action lawsuit brought against it by G3 owners. The plaintiffs allege that Apple broke California consumer protection laws when it reneged on its promise to offer full support for G3-based Macintosh machines.

"Plaintiffs and the similarly situated consumers experienced dramatically slower QuickTime movie frame rates, 2D graphic performance, and OpenGL performance, as compared with the performance of these machines under a fully optimized system such as OS 9," the original suit says. Apple would not provide updated drivers for the videocards and also refused to update DVD software for many of the G3 machines, the suit says.

"Based on information and belief, Apple's scheme of misrepresentation, as alleged above, has been used to accelerate a deliberate policy of planned obsolescence. In 1998 and 1999, Apple encouraged its loyal customers to upgrade their computers and to buy Apple premium-priced products based on the promise that the then current G3 computers would be capable of running Apple's next-generation operating system OS X. Then, in some instances less than two years later, Apple intentionally dropped support for key components of these computers to force these loyal consumers to once again upgrade their computers and to buy Apple's new premium-priced products, such as the G4," the suit says.

The suit sought an injunction that would force Apple to provide new ATI card drivers and an updated DVD player for the G3 machines. Apple has instead decided to refund G3 owners who purchased OS X.

Under the conditions of the settlement, consumers who are refunded must return the disc to Apple and declare under penalty of perjury that they will no longer use OS X on the machine. These consumers will receive up to $129 for OS X.

Consumers who want to continue using OS X but are unhappy with its performance may receive a $25 coupon if they declare that the DVD player and their ability to run certain graphics were impaired. The coupon is valid toward the purchase of Apple hardware or software worth more than $99.

Others who qualify for the refund include: owners of iMac Revs. A and B in Bondi Blue built between August 1998 and January 1999; owners of iMac Revs. C and D in five fruit colors; owners of certain Power Mac G3 Mini-towers, desktops, and All-in-Ones; owners of certain G3 iBooks and iBook SEs made between September 1999 and September 2000; and owners of certain G3 PowerBooks made between May 1998 and February 2000. For a more complete list of units, visit http://appleosx.rosenthalco.com.

Pissed-off that your old G3 can't run OS X well? Apple is offering refunds to settle a class-action suit.

> *"APPLE INTENTIONALLY DROPPED SUPPORT FOR KEY COMPONENTS OF THESE COMPUTERS TO FORCE THESE LOYAL CONSUMERS TO ONCE AGAIN UPGRADE..."*

Help, My Router Is Spamming Me

DEAR DOG: Can you help me with a spam problem? Ever since I installed my new Belkin router, I've been getting spam windows and I can't figure out where they're coming from. I've installed anti-spy programs but I still get these odd pop-ups that won't go away, even with reinstalls of the OS.

— PETER

THE DOG RESPONDS: Peter appears to be the victim of Belkin's misguided attempt to protect its customers. Belkin admits that its own routers seemed to be spamming people.

"In our efforts to make home networking easier and less intimidating, we unintentionally overlooked the effect that this Parental Control sign-up issue would have," the company said in a press release. "We never intended to compromise the trust of our customers nor has it ever been our policy to deliberately spam our customers."

According to Belkin, the problem occurs when firmware on its older routers is updated or when any of its wireless routers is installed. At some point, the router pops up with an offer for a six-month trial of software that lets parents configure the router to restrict Internet access. The pop-up asks consumers to either activate the free trial or click "no thanks." If consumers click "no thanks," the pop-up goes away and stays away. Many people, however, don't click "no thanks," but instead close the window by clicking the X. If that's the case, the spam/pop-up window continually reappears. Belkin says it has sold thousands of routers mostly without complaint.

To fix the problem, Belkin is offering a firmware update on its web site that makes the pop-up window go away; the Parental Control feature will still be available for those who want it. Get the firmware at www.belkin.com.

Your Router is connected to the Internet
BELKIN
FREE Parental Control - Activate it Today!
Make your Internet safe!
Activate FREE Trial
No Thanks

Belkin router owners greeted by this pop-up spam ad can blame it on their hardware.

Copyrighted material

EZ Vanishing Act

DEAR DOG: On November 27, 2003 I ordered two ink-jet cartridges from **EZ-Inkjets.com**. The company promised delivery within a week. Giving them the benefit of the doubt, I patiently waited for two weeks before contacting the company. I have sent three faxes with no response. I have left messages at its California telephone number nine times at my expense. No response. I have sent e-mail as well. No response.

Although the company took my money, I can't even access my order information; the web site says I don't exist. Someone did e-mail me an auto order-confirmation in late September, but nothing else. All I want is my $45.93 back. I used a debit card of course. Dumb on my part. Please help.

—RUTH WIKE

THE DOG RESPONDS: Bad news, Ruth. EZ-Inkjets seems to have disappeared. A visit to the site says it's under construction. And although the company's voice mail continues to function, no one responded to calls from the Dog.

Ruth isn't the only person unhappy with EZ-Inkjets. According to the Better Business Bureau, EZ-Inkjets is "unsatisfactory, based on a pattern of unanswered and unresolved complaints.

"Complainants allege they receive defective merchandise, and they are unable to obtain exchanges, refunds, or credits for returned items. Some customers complain they purchase color cartridges that print in only one color. Others report cartridges simply do not work at all. Most complainants allege they are unable to contact the company, claiming the company fails to respond to e-mails and letters, and there is no listed phone number on the company web site. The company responds to some complaints by contacting the customers directly, and resolving complaint issues. A few complaints were addressed by issuing credits or refunds. Most complaints are unanswered."

The Dog was unable to reach any officers of EZ-Inkjets for comment.

Although Ruth used her debit card for the purchase, she should check with her bank to see if she has any recourse. Unfortunately, most debit cards simply don't offer the protection of a good credit card. While not the cheapest lesson, it's better to learn it with a $45 purchase rather than a $500 video-card or system.

While it's unlikely that EZ-Inkjets will come back from its limbo state, if it does re-emerge, readers should consider it off limits and in the Dog House. Woof.

Big Freaking Boomslang

DEAR DOG: I know you've written about Boomslang in the past, so I wanted you to know that you can now buy the Razer Boomslang from BFG Technologies. The BFG Tech web site provides information on the new Boomslang high-precision gaming mice. Hopefully, a good company like this will keep gamers happy by keeping the mice going.

— JUSTIN

The Boomslang has once again been resurrected from the dead by BFG Tech.

> *"I HAVE SENT THREE FAXES WITH NO RESPONSE. I HAVE LEFT MESSAGES AT ITS CALIFORNIA TELEPHONE NUMBER NINE TIMES AT MY EXPENSE. NO RESPONSE. I HAVE SENT E-MAIL AS WELL. NO RESPONSE."*

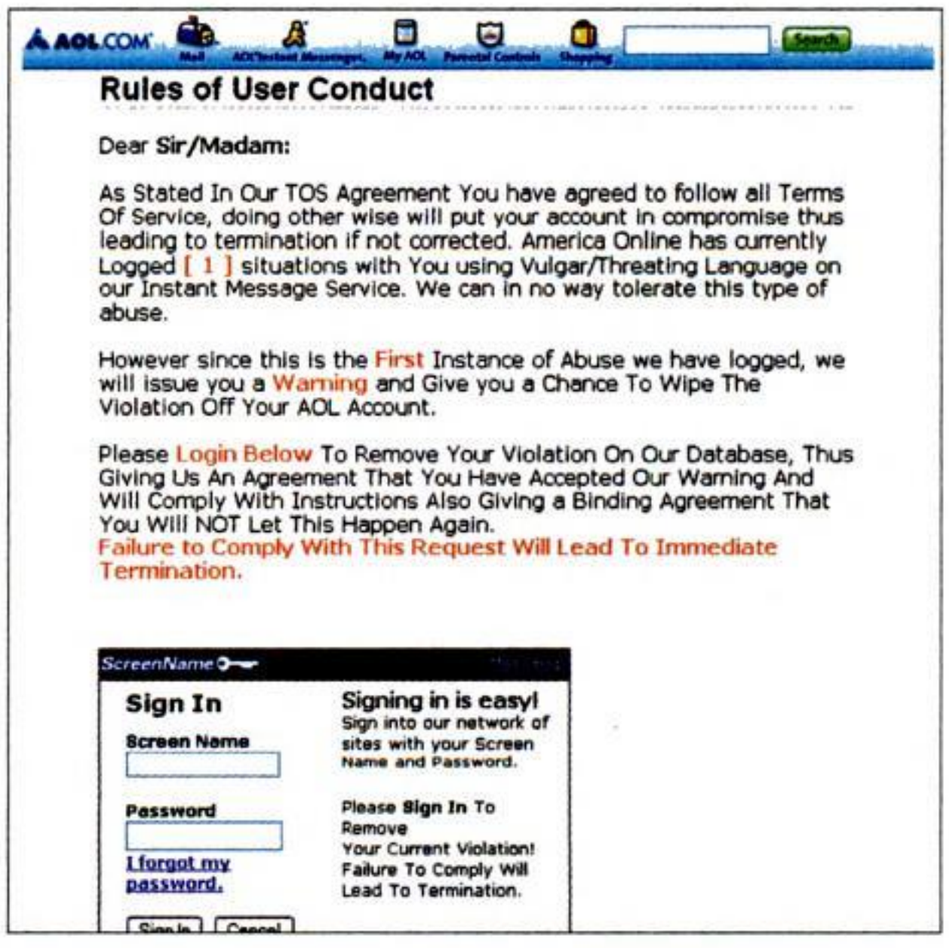
THE DOG RESPONDS: Although the Dog has expended much ink on the unfortunate fate of Razer and its Boomslang product over the last year, it looks like the company may be back. The Dog chewed bones with a spokesman at BFG who said, "we will support our version, the Sniper Boomslang 2100. Razer and Terratec (Europe) will support their brands, respectively. The mice are in production (these aren't old inventory), and we are currently in discussions with Razer on developing the next-generation gaming mouse. The Sniper does have improvements over previous generations. Please visit our product page for more information: www.bfgtech.com/sniper.html."

The Dog isn't ready to recommend that you buy a mouse from Razer, but with BFG standing behind its mice, you stand a much better chance of receiving full support.

Scummy Scammers

Readers Tony Moffitt and David Conzatti want to alert others to the growing number of eBay and AOL scams going on. Both readers sent the Dog e-mails they received ostensibly from legitimate services asking them to submit personal information.

This isn't a new scam, but it's certainly becoming a favorite among scumbags online. The scammers, in the guise of AOL, eBay, or PayPal, for example, send bulk e-mail to innocent consumers. The spam invites the consumer to click a link for account info, but instead of being channeled to the official site, they're taken to a temporary web site where they're asked to "log in." The site logs the consumers' password and name, then coughs up a fake error message before forwarding the unwitting consumer to the company's real home page. Usually, the consumer doesn't even realize that he or she has been compromised for months. The lesson here is to be hyper-skeptical of any e-mails that ask for your personal info, and to make sure you are indeed at the web page you think you're at. You can do this by enabling the status bar in *IE*. In *IE's* View menu, select "Status Bar." ■


AOL.COM
Search
Rules of User Conduct
Dear Sir/Madam:
As Stated In Our TOS Agreement You have agreed to follow all Terms Of Service, doing other wise will put your account in compromise thus leading to termination if not corrected. America Online has currently Logged [1] situations with You using Vulgar/Threating Language on our Instant Message Service. We can in no way tolerate this type of abuse.
However since this is the First Instance of Abuse we have logged, we will issue you a Warning and Give you a Chance To Wipe The Violation Off Your AOL Account.
Please Login Below To Remove Your Violation On Our Database, Thus Giving Us An Agreement That You Have Accepted Our Warning And Will Comply With Instructions Also Giving a Binding Agreement That You Will NOT Let This Happen Again.
Failure to Comply With This Request Will Lead To Immediate Termination.
ScreenName
Sign In
Screen Name
Password
I forgot my password.
Signing in is easy!
Sign into our network of sites with your Screen Name and Password.
Please Sign In To Remove Your Current Violation! Failure To Comply Will Lead To Termination.

This phony AOL page steals your account and password info.

Got a bone to pick with a vendor? Been spiked by a fly-by-night operation? Sic The Dog on them by writing **watchdog@maximumpc.com**. The Dog promises to get to as many letters as possible, but only has four paws to work with.

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HARDCORE HARDWARE 2004

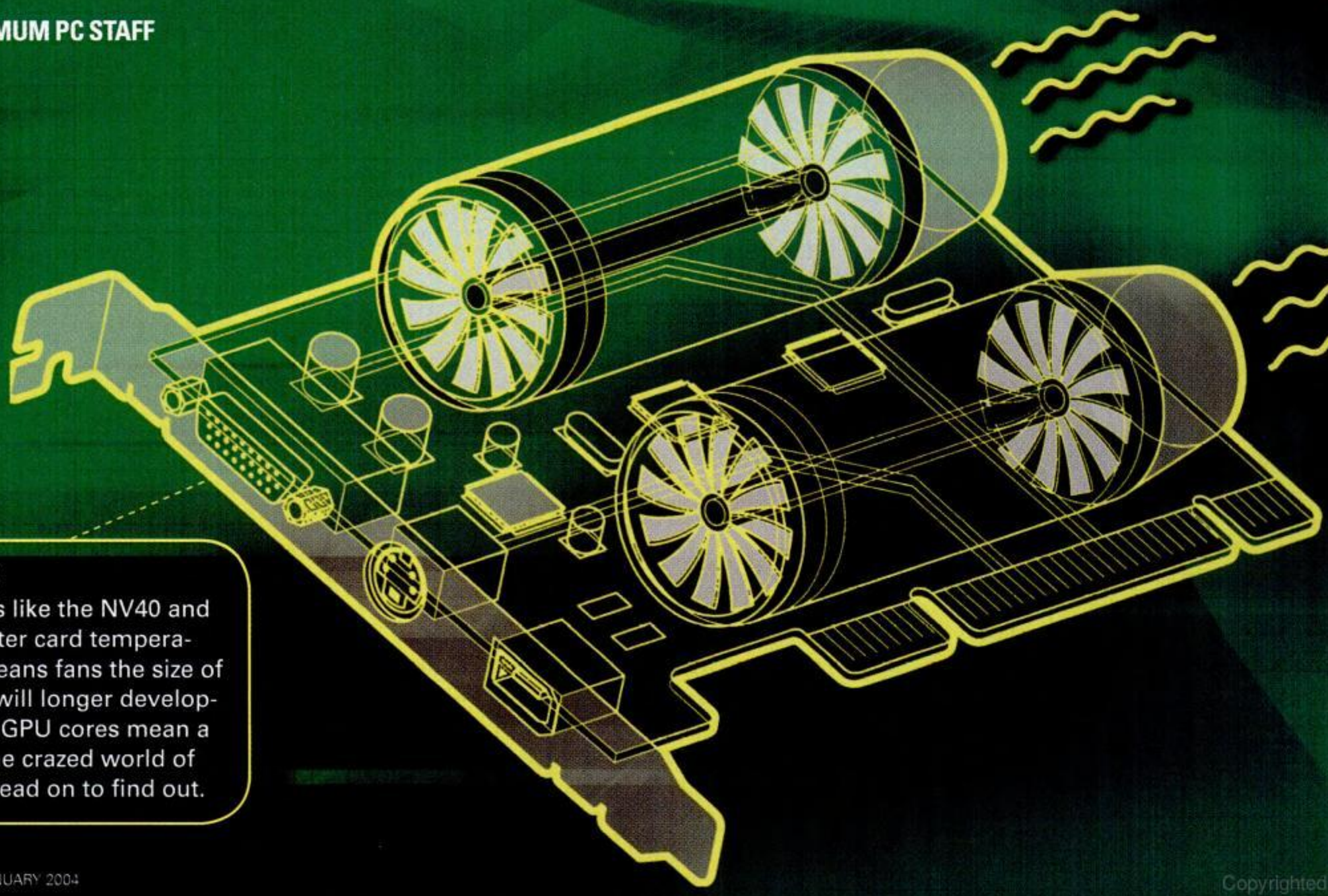
We sent our staffers into the field to get the inside scoop on the most significant products and technologies that will be appearing in PCs over the next 12 months. What we found astonished us.

BY THE MAXIMUM PC STAFF

This year will be a banner year for serious hardware. Seriously. Across the board, virtually every single major tech and component category—CPUs, memory, networking, and even data storage—is exhibiting signs of significant, innovative evolutionary leaps. Faster data transfer rates. New socket types. Wider wireless coverage. If you're a power user or an upgrade junky, the next 12 months will leave you short of breath. And possibly short of cash, which is why we meticulously prepared a handy 20-tip list of things you should be mindful of, preparations you should make, and technologies you should avoid as you enter the new year.

Interestingly, as we were going to press, we got our hands on a PC that serves as a sort of microcosm of the rapidly swirling tech currents. L Computer's modder-inspired, next-generation approach to its Mach L system lineup is so controversial many critics have a hard time accepting it (see page 38 for details).

Like we said, 2004 is going to be a banner year for hardware... so let's get moving!



VIDEOCARDS
New GPU cores like the NV40 and R420 mean hotter card temperatures. Which means fans the size of turbo jets. But will longer development times for GPU cores mean a slowdown in the crazed world of chip cooling? Read on to find out.

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CPUs
Intel's upcoming Socket T approach makes it clear that old-school pin-based sockets are going, going, gone.

NETWORKING
2004 is the year of Wi-Fi. As more and more home wireless networks sprout up, can the neighborhood network be far behind?

TOPDOG ILLUSTRATION

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CPUs
AMD and Intel Go High-Performance

With the launch of the Athlon 64 FX and the Pentium 4 Extreme Edition, 2003 was a momentous year for desktop CPUs. And from what we can tell, you'd best get ready for more silicon roller-coaster rides in 2004. Intel will roll out not one but two chips this year. The first will be the much-awaited CPU code-named Prescott. Using Intel's new 90 nanometer process with strained silicon, Prescott will feature a new instruction set (think SSE3), improved Hyper-Threading, 1MB of L2 cache, and an 800MHz bus. Although Intel planned to launch Prescott in the last quarter of 2003, Prescott won't reach fruition until the early part of 2004. The new chip is expected to be released in Socket 478 and will likely work with the majority of the new 875P and 865PE motherboards. Many early boards that can't support the higher wattage requirements of the Prescott may be SOL though. If you plan to buy a board now in anticipation of Prescott, it's critical that you check with the motherboard vendor for assured support. Luckily, most boards that will work with the Pentium 4 Extreme Edition should also work with Prescott.

STORAGE SERIAL ATA 2.0 DOUBLES POTENTIAL PERFORMANCE

When Serial ATA 1.0 arrived in 2003, drive manufacturers tentatively dipped their big toe into the water. In 2004, we expect a Spring Break-style belly flop. Not only will manufacturers migrate the majority of their drives to the SATA interface in '04 (this migration will include optical drives as well), but the Serial ATA spec will be upgraded to version 2.0 via several new performance features.

The most high-profile change to the SATA spec in 2004 will undoubtedly be an increase in the interface's maximum transfer rate from 150MB/sec to 300MB/sec. This jump won't offer any tangible performance boost, however, as today's drives are barely pushing the upper limits of 2000's ATA/66 spec (for Pete's sake). Along with the interface boost, the other big news for SATA 2.0 is the addition of a new queuing algorithm called Native Command Queuing (NCQ). This feature allows the hard drive to respond to data requests in the order it deems most efficient, rather than the using the current method of responding to requests in the order received.

The best way to understand NCQ is to think of a hard drive as an elevator that responds to requests by moving its mechanical parts to the desired location. It's terribly inefficient for an elevator to go to floors in the order they are punched, such as going from the second floor to the tenth, then back down to the third floor. An NCQ drive would function like a modern office elevator, organizing the requests and executing them in the optimum order. (Thanks to Intel and Seagate for the elevator analogy.)

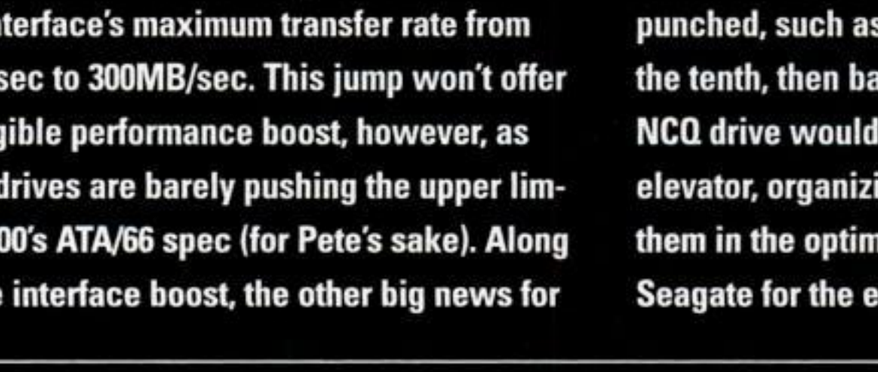
NCQ also allows interrupts (usually sent after each command is completed) to be aggregated, reducing overhead. Finally, NCQ takes advantage of a new SATA feature named First Party DMA, which grants the hard drive direct access to the host controller's memory buffer. This also reduces overhead.

This next generation of SATA lovin' sounds tasty, but it's important to keep two thoughts in mind. First, the "real world" benefit of NCQ is workload dependent and biased towards multithreading environments. Second, none of the SATA drives or host adapters currently on the market support NCQ, but the second-generation devices will. So if you simply must have NCQ, wait until the next-gen drives are available, which should be sometime in Q2 2004.

NATIVE COMMAND QUEING—what's the big whoop?

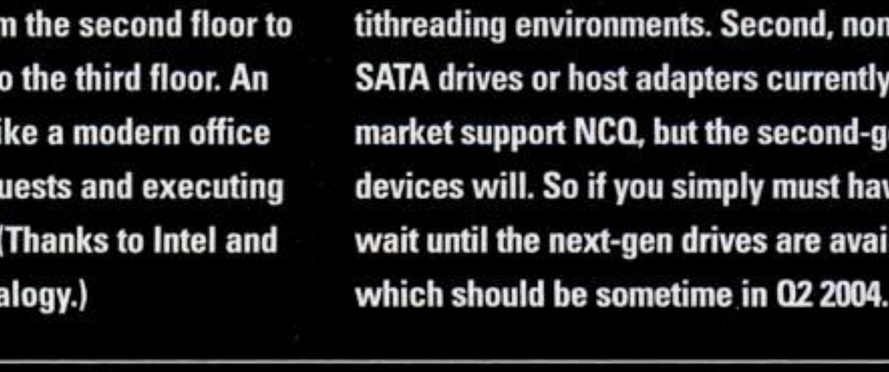
NCQ will allow a hard drive to retrieve data and process requests much more efficiently than current drives

Old Way



Data has to be retrieved in the order in which it's requested, so incoming requests are handled sequentially for **A, B, C, D,** requiring multiple passes.

New Way



Data is reordered to speed up collection, so requests for **A, B, C, D** require just one pass.

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Of course, you may not even want to buy a Socket 478 board if you're really concerned about long-term upgrades. That's because Intel is expected to release a second-generation CPU based on its new 90nm process in the second half of 2004. Not much is known about the chip, code-named Tejas, but it's said to include new instructions, even better Hyper-Threading, and 1MB of L2 plus a 1066MHz system bus. It's also supposed to come in a brand-new Socket T motherboard. Instead of using the common zero insertion force socket, Socket T mobos will use a clamping device to hold the CPU down. Tejas holds special distinction because industry analysts believe Intel may activate some form of large memory addressing scheme in the chip to counter AMD's Athlon 64 chips, which promise incredible memory addressing opportunities when running in 64-bit mode. This is all conjecture of course, but if Tejas does include such support, many believe it will be a separate standard than AMD64. Tejas would then become the third 64-bit chip Microsoft offers Windows XP support for.

Intel's CPUs are expected to buzz along at 3.8GHz by the end of 2004.

AMD's plate will be equally full as it pushes out several new CPUs to keep itself competitive. In the first half of 2004 the company is expected to introduce a chip code-named Newcastle. Like the current Athlon 64 and Athlon 64-FX, the chip will be based on a 130 nanometer process, but it may sport just 512KB of cache compared with the 1MB in Athlon 64 and Athlon 64-FX. Why build such a part? The short answer is that the large size of the A64 and A64-FX core costs too much. By shrinking the cache, AMD can produce more CPUs for less money.

In the second half of 2004, AMD plans to introduce the "San Diego" and "Winchester" CPUs using a new 90nm process with Silicon-On-Insulator technology (SOI), which makes for a faster electron flow, which will allow CPUs to eventually hit higher clock speeds. Not much information is available about San Diego, but we're guessing it will be similar to the current Athlon FX except smaller, faster, and able to support

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MEMORY DDR2 IS COMING!

Still smarting from making the switch from PC1066 RDRAM to dual-channel DDR? Well, get ready for another switch later this year when DDR2 hits store shelves. A sequel to DDR, DDR2 increases potential bandwidth by prefetching twice as much data as DDR does. Thus, a DDR2 400 module could in the right situation offer twice the theoretical bandwidth as DDR400.

DDR2 itself will operate at a lower voltage of 1.8 volts versus 2.5 volt DDR RAM, and will use ball-grid array memory similar to that used on high-performance videocards. The DIMM will have 240 pins versus DDR's 184 pins. While we will still use the clock speed designation, the industry nomenclature will identify a DDR2-400 module as PC2-3200. A DDR2-533 part will be called PC2-4300.

Rambus will also make one more play early this year when SiS releases the R659, its anxiously awaited, long-delayed quad-channel RDRAM chipset. R659 will run PC800, PC1066, and PC1200. Steady now—these aren't foo-foo bandwidth numbers like the ones used to describe DDR modules, kids. These are real clock speeds. Thus the R659 will run a pair of dual-channel RDRAM modules at 1200MHz for a total of 9.6GB/s of bandwidth.

SiS has also taken some steps to reduce the latency that RDRAM was criticized for. While we've been looking forward to the R659 for months, it probably won't be enough to displace the move toward DDR2. If you think Intel will suddenly rekindle its love-fest with Rambus, know this: Intel just made a $450 million investment in Micron, a company that doesn't fab RDRAM at all.

One last memory technology may also rear its head this year: Kentron's Quad Band Memory. Promising DDR2-level data rates last summer, QBM was positioned for greatness, but we still haven't seen chipsets or modules. Interestingly, VIA claims support for the memory with its PT880 P4 chipset.

Maximum PC's 20-Point Plan for Getting Ahead of the Tech Curve

Given the rapid rate at which technology evolves these days, it's getting more and more difficult to plan for upgrades. With this in mind, we set forth our 20 most sacred technology mantras for the coming year. Clip this one out and save it, kids. It could save you lots of grief.

1 FUTURE-PROOF YOUR MOBO: With two new processors on tap from Intel and one from AMD this year, it's important that the motherboard you buy offers support for these upcoming CPUs. On the Intel side, you'll want a board that works with the Pentium 4 Extreme Edition and the upcoming Prescott CPU. If you're really upgrade conscious, it may be worth waiting until fall 2004—that's when Intel's due to release an entirely new CPU mount for its Tejas chip. Similarly, AMD will introduce a Socket 939 version of the Athlon 64 FX that won't work with old boards.

2 SERIAL ATA'S THE WAY: SATA is here to stay, so the sooner you get on board, the better. Your next mobo should have at least two SATA ports, and your next hard drive should support SATA natively.

3 DON'T WEAR DDR AFTER JUNE: If you don't want to end up with old technology, then don't invest in DDR RAM come summer because a sequel called DDR2 is on tap. DDR2 will use lower voltages to reach higher frequencies and will be incompatible with the current DDR.

4 EMBRACE YOUR HIGH-END VIDEOCARD: This is extremely simple: If you own an expensive new videocard based on the NV30 or R300

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nonregistered dual-channel DDR400 and possibly even dual-channel DDR2 memory. Winchester follows the lead of the plain-jane Athlon 64 and will offer only single-channel support but will be built on the more efficient 90nm process with SOI. The move to 90nm will be critical for AMD if it is to compete with Intel on price—its 130nm chips are simply too big. We've also heard rumors of AMD producing two budget chips using the same Socket 754 boards as the Athlon 64 3200+, but without the 64-bit support. We don't see them happening, but we'll be the first to admit that no one knows for sure.

CHIPSETs
More, More, More!

New CPUs mean new chipsets. Intel's Grantsdale will be a big move for the PC industry with its support for PCI Express, DDR2, and PCI Express for Graphics, the upcoming replacement for AGP.

Don't fret too much about tossing your Audigy 2 ZS card; most motherboards with Grantsdale will support both PCI Express—a serial bus that promises much higher data transfer rates—and PCI devices. Your Radeon 9800 XT may be out on its ear, though, as Grantsdale will dump AGP in favor of PCI Express for Graphics. The Grantsdale will be paired with Intel's new southbridge, the ICH6, which adds a crap-load more USB and Serial ATA ports. The chipset will also likely support both DDR and DDR2 RAM types.

You might want to dust off your RDRAM modules one more time this year when SiS finally ships its R659 chipset with quad-channel RDRAM support. Yeah, that's right—quad-channel with up to PC1200 support.

Apparently intent on preventing Intel from dominating the dual-channel DDR

continued→

PC CASES BTX GETS AIRFLOW RIGHT

Here's a tough question for you. Look at your PC and contemplate which component, besides the mouse and keyboard, would remain useful after eight years. The CPU? Hardly. RAM? No way. Videocard? Impossible.

There's actually only one part that could still be kicking around after nearly 10 years: the ATX case. That's about to change. This year we'll see the first systems using the new BTX formfactor.

While the ATX case won't die anytime soon, the time has come for BTX to slowly take over. Why make a new formfactor for desktop cases when the current approach seems to work fine? Because the Advanced Technology eXtended (ATX) formfactor was designed for 1996 PC technology. To give you an idea of how ancient the design is, ATX was originally supposed to suck air in through the power supply and blow it over the CPU to keep it cool, an idea that's long since fallen by the wayside. In contrast, BTX is designed to meet the thermal requirements of tomorrow's CPUs and videocards.

The immediate difference you'll see on a tower case is the reverse mounting of the motherboard. In most BTX towers, you'll have to pop open the right side instead of the left to access the interior. BTX also makes a major change with the CPU placement. In ATX cases, the CPU is positioned just under the power supply. In the BTX design, the processor resides in the middle-front of the case—an area the ATX case typically reserves for hard drives. This way a fan can suck cool air from outside the case and blow it directly over the CPU first. This is a big shift; in an ATX case, cool air is usually pulled in from the front and gets heated by other components before even reaching the CPU. Airflow in a BTX case will be routed in from the front, come over the CPU, and then over the chipset, RAM, and voltage regulators for improved flow patterns.

BTX will also call for a new power supply with a 24-pin connector. While the BTX spec will be released later this year, it will take several years for it to completely supplant ATX. So don't sweat it if you just bought a $200 aluminum case.

chipsets, do not buy a newer card from the same chip generation. Upgrading from the original rev of a GPU to the speed-bumped version released six months later will likely net you just a 5 to 10 percent performance increase. It's not worth the cash.

5 GO GIGABIT ETHERNET: When it comes time to replace old hubs, switches, and routers, don't settle for mere 100Mbit crap. Go Gigabit, or bust!

6 CARRY PLENTY OF CACHE: An 8MB hard drive cache used to seem exorbitant. But the 30 percent improvement it gives you over a 2MB cache is so impressive, you'd be a fool not to upgrade.

7 ATHLON 64 FOR LONG-TERM ROMANCE: We'll probably all look back at 32-bit computing one day and belly laugh. If you don't want to be stuck with a 32-bit CPU in the age of 64-bit computing, start thinking about an Athlon 64 or Athlon 64 FX.

8 WINDOWS + 10,000RPM DRIVE = GOOD TIMES: If you have the cash, we highly recommend the 10,000rpm Western Digital Raptor for your OS, apps, and maybe even a game or two. Believe us: You'll notice a huge difference. Your PC will boot in no time. Games will load before you return with your beer. Your PC will literally be born anew.

9 BUY 5.1 SPEAKERS AND A SOUNDCARD THAT CAN HANG: DirectSound3D has been around for ages, and every game on the market takes advantage of it. Whether you're embroiled in an intense three-way fight in *Planetside* or sneaking into a Chinese base in *Splinter Cell*, positional sound cues can tell you exactly where the enemy is. All the better to liquidate his assets.

10 GET GIGGY WITH IT: One gig of PC3200 DDR SDRAM can be had for as little as $300. If you already have 512MB of memory, you can double it for the price of three games. What's stopping you?

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Lighten Up.

It wasn't so long ago that if you wanted to bring your data with you, your hardware had to come too. Well, that's all in the past now thanks to the new SanDisk Cruzer™ Mini. At under half an ounce, the Cruzer Mini goes anywhere, and with up to 256MB of flash memory, it takes a lot with it. Hi-speed USB 2.0 compliant, SanDisk's Cruzer Mini lets you transfer data faster than ever before. And at less than 8mm thick, all it needs is a single USB slot. Just drag, drop, and go. It's all about convenience – no extra hardware, no worries.

So whether you're installing utilities or updating print drivers for the umpteenth time, you can take your files with you wherever you go – and you won't even need your dolly.

For more information on SanDisk Cruzer Mini, visit www.sandisk.com/maximum

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market, SiS will also begin volume shipments of its dual-channel DDR SiS655TX chipset. And, let's not forget, SiS will roll out the SiS656 with DDR2 support and PCI Express later this year.

The Pentium 4 will also continue to host VIA, which should have volume shipments of its first dual-channel DDR chipset for the P4 this year. VIA claims its PT880 will be faster than even Intel's 875P chipset. VIA will also try to outflank Intel by introducing its PT890 chipset, which will offer DDR2 and PCI Express support, as early as February—before Grantsdale hits the street. Both chipsets will support DDR and DDR2 RAM. Later on this year, we expect Intel to roll out its Copper River chipset when Tejas splashes down.

AMD, meanwhile, has left desktop chipsets to nVidia and VIA. nVidia plans to have volume shipments of its new nForce3 250Gb chipset ready early this year for the Athlon 64-series. The 250 will add native Gigabit support, native Serial ATA, and software support for RAID 0, 1, and 0+1. nVidia plans to support PCI Express this year, but hasn't disclosed the name of the chipset yet.

Consumers really hooked on the Athlon XP will get a nice update from nVidia this year when it revs the nForce2 to add current technology like 7.1 audio support, native Serial ATA RAID, and Gigabit Ethernet to the Athlon XP platform.

Not content to allow nVidia to graze on the Athlon XP, VIA will introduce its KT880 in November. This chipset will finally add dual-channel DDR support and native Serial ATA support. Finally, both VIA and nVidia also plan to add PCI Express support to their Athlon 64 and Athlon 64 FX chipsets later this year as well.

OPTICAL DRIVES:
Dual-Formats and Dual-Layers Trump Blue Lasers

Most DVD burners on the shelves today are dual-format, the result of an awkward standards truce that remains a confusing turn-off for many consumers. Although we were early champions of the DVD-R/W format because of its greater compatibility with set-top players, there's no denying that the DVD+R/W folks are leading the tech edge today. For example, Philips, one of the major players behind the DVD+R/W format, recently demonstrated a working prototype of a 16x DVD burner that is able

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NICE DISCS: Roger checks out a separated dual-layer disc. Skip says, "Say, Rog, have you been working out?"

11 BABY GOT BACKUP: Power spikes, dips, and surges cause more system crashes than all the crappy hardware in the world. Buy a battery backup to protect your new PC from power problems.

12 KEEP IT COOL: Next-gen components run red-hot, so don't get burned by neglecting your new system's cooling. A well designed air-cooled rig can be more effective than a poorly implemented water-cooled rig. See our How-To on page 64 for a quick cooling primer.

13 LOOK FOR THE "HIGH SPEED" LABEL: External optical drives and hard drives need a lot of bandwidth, but don't let the "USB 2.0" label fool you. The official spec for USB 2.0 obfuscates facts in a manner worthy of *Pravda*; only products labeled as "High Speed USB" can operate at the full 480Mbps USB 2.0 spec. "Full Speed" (12Mbps) and "Low Speed" (1.5Mbps) do not.

14 DON'T SETTLE FOR SINGLE-FORMAT: Clearance-shelf prices are tempting, but you'll regret buying a DVD burner that supports just +R/W or -R/W media. The format you choose will be the format your set-top player doesn't recognize—guaranteed.

15 DON'T GET AHEAD OF THE GAME: Several *Maximum PC* staffers learned this lesson the hard way. Don't buy hardware in anticipation of purported ship dates, as the still-nonexistent *Half-Life 2* and *Doom 3* have taught us.

16 MO' BETTER MOBO: The CPU isn't the only thing that makes a motherboard obsolete. It's not worth saving $40 on a mobo that uses RDRAM and doesn't have any Serial ATA connectors. Do your research and make sure the current technology is supported.

17 CALL OUT YOUR PC'S WEAKEST LINKS: The worst bottlenecks in most systems tend to be hard

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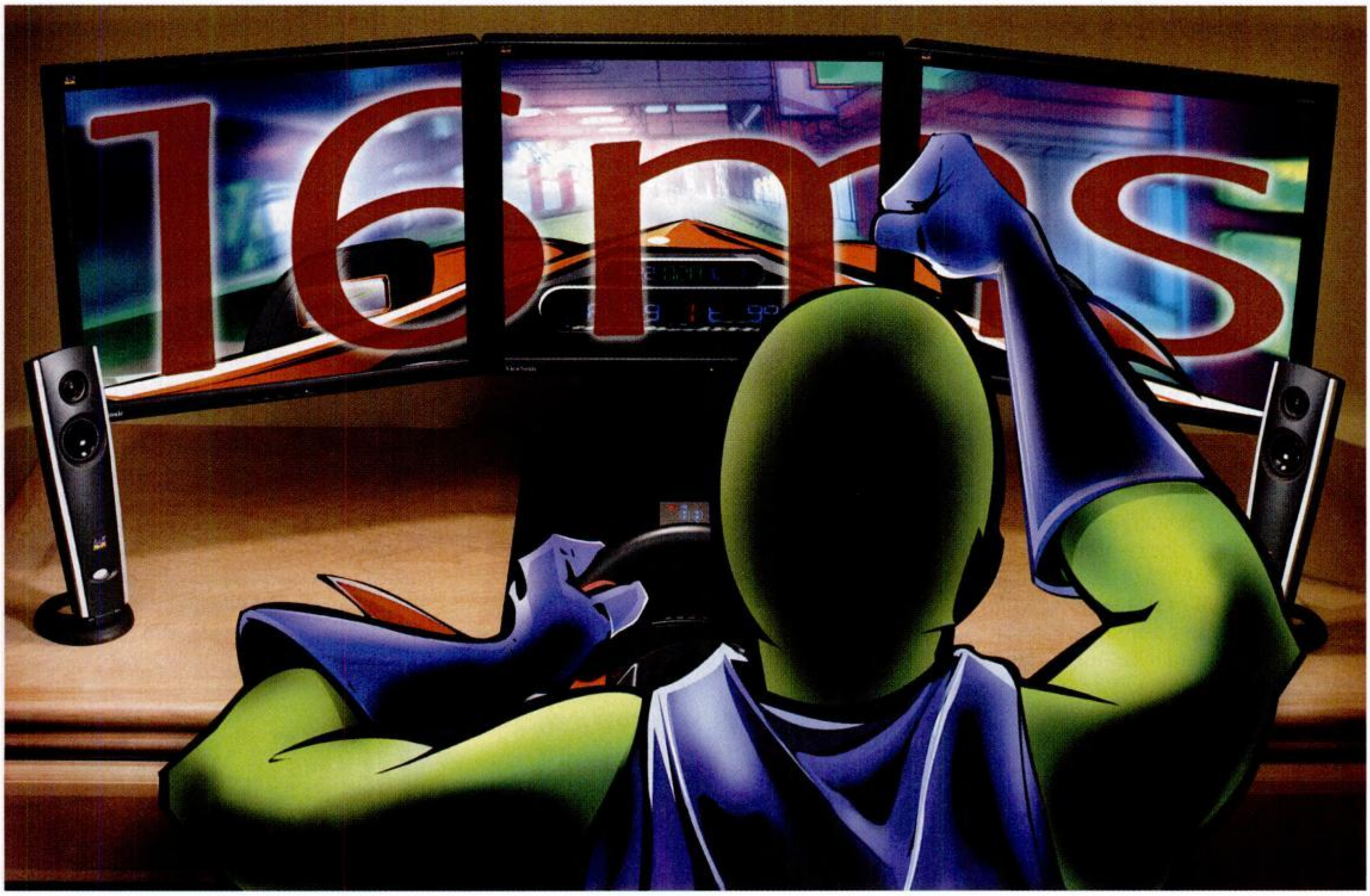
Are you ready for superhuman reflexes?



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to fill a 4.7GB disc in *six measly minutes!* The 16x DVD media spec should be set by mid-year, but Philips cautions that there's little room for speed increases beyond this, as we approach the highest safe rotational velocity for polycarbonate-based media.

The big leap forward in 2004 is, without a doubt, the rollout of dual-layer DVD burners for home use. Just like set-top DVD players, these drives will be able to shift focus from the top layer of a disc to the bottom layer, nearly doubling the capacity of a single piece of recordable DVD media from 4.7GB to 8.5GB.

Once upon a time, blue-laser technology seemed like the sexiest thing going in optical drives. Sony debuted the first consumer "Blu-ray" DVD recorder last year in Japan, with optical media that could store up to 23GB each—enough for two hours of high-definition video. But high-definition TV still hasn't taken off here in the States, and the technology is still too expensive to be practical for PC storage. So Blu-ray, while sexy, is about as practical as buck hunting with an Uzi.

MOBILE CPUS
Prescott Notebook Edition?

If you're overly concerned about mainstream media reports that the desktop is dead because consumers bought more notebooks than desktops last year, calm down. The numbers are based on the total number of retail units sold in the U.S. and don't include direct PC sellers such as Dell. Worldwide, notebook sales are in the 20 percent range. Still, there's no denying that people are snapping up notebooks more rapidly than they ever have.

This year, Intel will continue to churn out faster and more feature-rich Centrino/Pentium M parts. In 2004, we'll see Intel move the Centrino/Pentium M to its 90 nanometer process with a chip code-named Dothan. Dothan will have 140 million transistors, improved prefetching, and a massive 2MB of L2 cache. You can count on Intel migrating its hot desktop technologies to notebooks via the Sonoma chipset. Intel also expects to somehow cram Prescott into notebooks and won't even rule out stuffing an Extreme version of Prescott into one.

In the second half of 2004, we'll see Sonoma, the chipset for Centrino. Expect DDR2, Serial ATA, PCI Express, Gigabit, and support for 802.11a/b/g/i. We'll also see the first notebooks with ExpressCard interfaces, which will eventually replace the old PC Card standard.

NETWORKING
802.11n Goes Super-Fat

It's safe to say that 2004 is the year of the network. With Gigabit Ethernet on every desktop, bold new wireless technologies to take Wi-Fi beyond your home and office, and explosive growth in personal area networking technologies, expect to build networks between all your electronics devices this year.

On the wireless front, the buzz is about 802.11n, the next big wireless networking standard. The working goal for 802.11n is to permit 100Mbit/s speeds with significantly less wasted bandwidth, much like the ubiquitous 100Mbit/s wired Ethernet standard. This is a dramatic improvement over today's wireless networking technology, which eats up to half the available throughput for simple tasks like resending lost packets.

On the Gigabit Ethernet front, we're already seeing the technology built into high-end motherboards and systems. Faster wired networks will only spread from here. Additionally, hardware prices on consumer level hubs and switches should drop significantly below $10 a port, making it practical to replace puny 100MBit Ethernet in homes and offices next year.

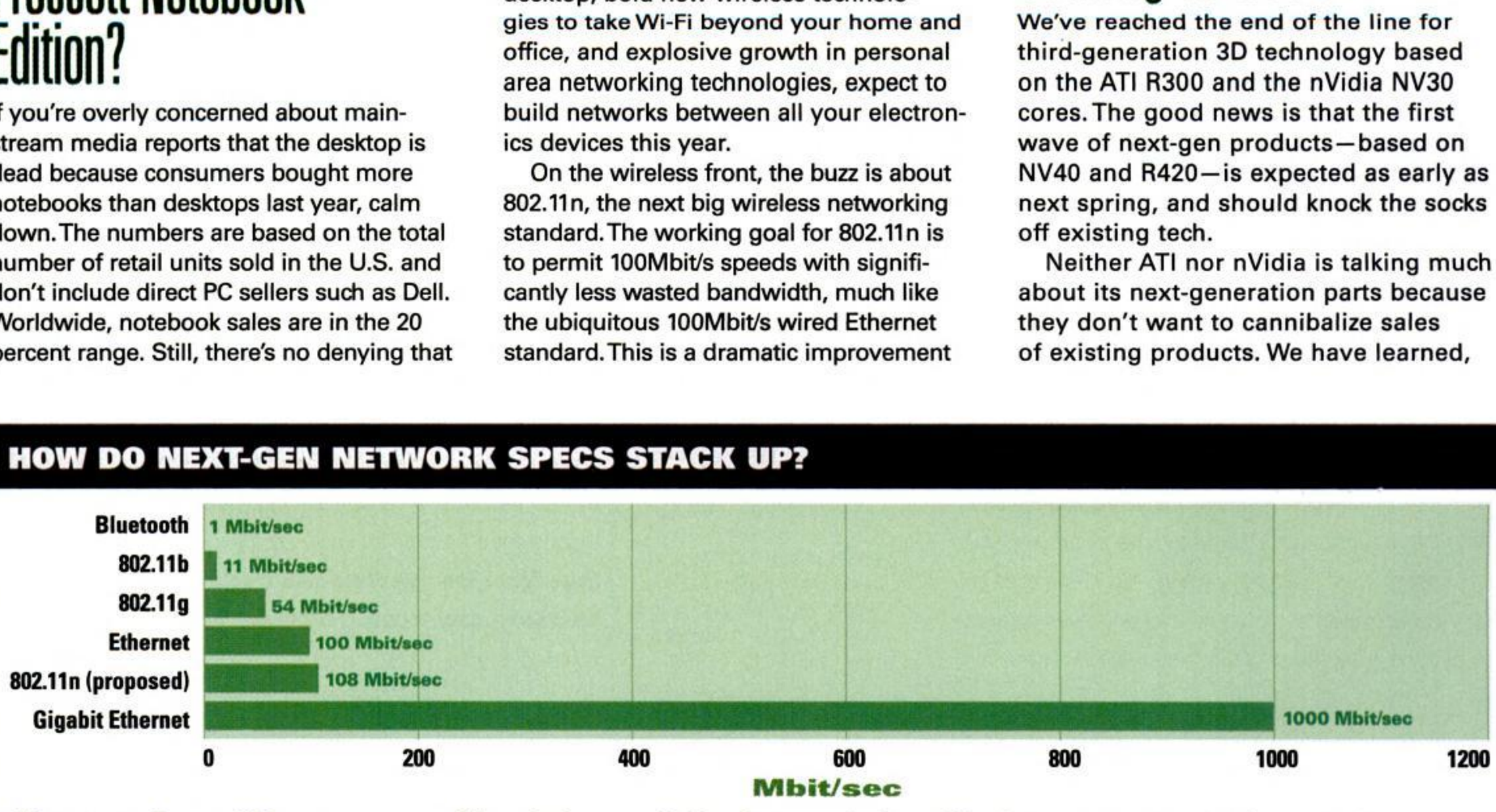
One final note: We're finally starting to see products that use Bluetooth to good effect this year, including PDAs, cell phones, mice, keyboards, and headsets. But another standard—802.15.3a—is currently under development by the IEEE, which aims to bring FireWire levels of speed and performance to wireless personal area networks. It's too early to tell whether 802.15.3a will complement or compete with Bluetooth.

VIDEOCARDS
NV40 and R420 Coming in 2004

We've reached the end of the line for third-generation 3D technology based on the ATI R300 and the nVidia NV30 cores. The good news is that the first wave of next-gen products—based on NV40 and R420—is expected as early as next spring, and should knock the socks off existing tech.

Neither ATI nor nVidia is talking much about its next-generation parts because they don't want to cannibalize sales of existing products. We have learned,

HOW DO NEXT-GEN NETWORK SPECS STACK UP?



Next year, there will be more networking choices available than ever before. Whether you want a wired or wireless connection, next-gen standards like 802.11n and Gigabit Ethernet will help you boost your throughput.

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however, that both the NV40 and R420 will support higher precision than existing cards, and we've confirmed that the NV40 will include full 64-bit precision, allowing for even more impressive high-dynamic range effects in future games.

We also expect that next-gen cards will function even more like CPUs, being able to run extremely long shaders more quickly than current cards. This means the next wave of GPUs will have better flow control and branching code paths. The new hardware will be able to run movie-quality shader programs without compromise.

Amazingly, Pixel Shader 3.0 is already built into DirectX 9. When you finally get to install a R420 or NV40-based GPU in your PC, you won't need to install a new version of Direct3D to take full advantage of it. Because DirectX 9 is future-proof, we don't expect to see a new version of DirectX until the next version of Windows is released sometime in late 2005 or 2006.

This is indicative of a larger trend in graphics. As GPUs become more programmable, like CPUs, we won't see new instructions and advances as frequently. Instead we will see faster GPUs that are able to run many more instructions on each pixel every clock cycle. New generations will have the same basic features as previous ones, but they'll have more pipelines, more shader units, and higher clock speeds. This is great news for gamers. Instead of games taking advantage of only the lowest common denominator—fixed function DirectX 7 level accelerators—developers will be able to write code that will look the same on everything from $99 cards to $500 cards, but will run faster and at higher resolutions on more expensive cards.

PORTABLE AUDIO/VIDEO

Forget MP3—It's All about MPEG-4 Players

You heard it here first: 2004 is going to be the breakthrough year for portable video. In fact, pocket-size devices that can store and play back full-length feature films may be as ubiquitous as MP3 players by the holidays.

It's inevitable, and we have MPEG-4 compression to thank for it. The older MPEG-2 format is used to squish massive video files down to a size that will fit on a single DVD with little loss in quality. MPEG-4, on the other hand, was designed to compress videos all the way down to a size that can be streamed over the Internet. Of course, the higher the compression, the more visual quality suffers, but that's a small price to pay, isn't it? Isn't it?

Clever Internet chaps have been using DivX and Xvid—both MPEG-4 compliant formats—to shrink and exchange full-length feature films down to less than 1GB each. Archos' AV320 (reviewed August 2003) was the first device that allowed these movies to be downloaded to a portable device and viewed on a 3.8-inch screen. The AV320 could even record video and output it to your monitor or television.

RCA is getting into the action with the Lyra RD2780, a personal video player that's a hair more than an inch thick and weighs just 10.5 ounces. And wild rumors have been flying that Apple's next iPod is going to push more than just audio. Apple denies a video iPod is in the works, but we suspect otherwise. After all, what better way to flog QuickTime, the company's own ailing video format?

With any luck, portable video players like the Lyra RD2780 will be the death knell for lame in-flight movies.

drives and system RAM. Before you splurge on a new CPU or videocard, throw out that old 5,400rpm and trade up to 7,200rpm or 10,000rpm. If your hard drive is constantly thrashing because of a memory deficit, add more RAM for an instant performance hike.

18 SHARE THE WEALTH: If you have $600 to upgrade an elderly PC, it just doesn't make sense to spend $500 of that on a spiffy new Radeon 9800 XT. Spread the love around to all the components. Know that you'll get the most bang for your buck from a combination of CPU, videocard, and memory upgrades.

19 KNOW WHAT'S WHAT: Component boxes advertise loads of meaningless numbers. Learn what they mean and filter out the ones that matter to you! Remember, no game will saturate an AGP 4x bus, today's hard drives barely top out the ATA 66 bus, and CD-RW burn times don't mean jack if you never burn CD-RWs.

20 CAN'T WE ALL JUST GET ALONG? It seems obvious, but sometimes common sense falls by the wayside when you're contemplating, say, a dazzling new videocard. When shopping for new components, stop, think, repeat. Does it make sense to buy a GeForce FX when you're saddled with a 1GHz P4? No. No, it does not.

21 IT'S OKAY TO FLY SOUTHWEST: Being a tightwad doesn't mean you have to miss out on all the fun. In fact, for technologies like CPUs and hard drives, the smartest buys often lie one or two steps below the latest and greatest. Even better, you'll spare yourself the hassles of as-yet-untested cutting-edge hardware.

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WINDOWS LONGHORN

XP's Successor Looks Mighty Different

Let's get this out of the way up front: Don't expect to install Longhorn on your PC until 2006. But that's not too long to wait for the most ambitious operating system Microsoft has ever released, is it? We don't think so either.

What makes Windows Longhorn worth waiting for? Three main features: a new database-driven file system, a fancy-pants 3D user interface, and the usual host of feature-laden updates to the interface. We "acquired" a copy of an early alpha build of the OS and gave it a full run-through. Keep in mind that this is very early software, and any features mentioned here may or may not make the final cut. Crucial features like the new 3D user interface are still absent in the build we tested, so treat this as the most tentative of previews.

Despite the missing 3D interface, several new interface elements are present in Longhorn. We immediately noticed the new Sidebar, a super-sized version of the existing system tray that will give you instant access to important apps, like the clock, calendar, and instant messaging apps. The sidebar takes up a lot of screen space, but can be set to auto-hide, just like the Taskbar. Or you can manually adjust the amount of space it uses.

After playing with it for a while, we're really stoked about the new WinFS file system. Inside My Computer there's a new entry called the Default Store. When you drag any *Word* documents, *Excel* spreadsheets, images, music files, or videos onto the default store, Longhorn will extract the meta-data from the files and save it in a fast SQL-based database. All the info contained in your ID3 tags for music, EXIF data for images, and author and keyword information for *Word* docs will be instantly searchable.

Once your files are ensconced in the default store, you can easily use one of Longhorn's prebuilt queries, which currently reside in the Start Menu. In the build we tested, we saw queries for Music, Documents, Photos and Videos, and Contacts. Each comes with several sorting options and is semi-configurable. In addition, you can save frequently used searches to the left side of the Query window. We expect that you'll be able to quickly write your own queries so you can sort any files stored on your computer anyway you want.

Several other new whiz-bang Longhorn features are worth mentioning. We're thrilled that Microsoft is finally including an end-user interface to help you prevent unwanted Systray apps from loading every time you restart the machine. We also like the new features in *Internet Explorer*, which include an advanced download manager that supports resumed downloads and allows you to prioritize each active download, as well as a pop-up stopper. Tabbed browsing is nowhere to be seen, though.

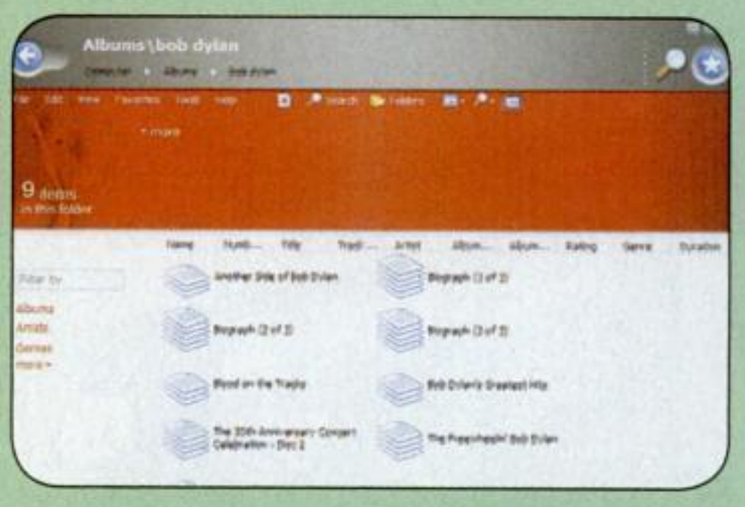
Want to see a little more of Longhorn? Check out the screenshots on this page for highlights. ■

The Longhorn desktop includes the Sidebar (top-right corner), a new place for always-running apps with dynamic updates to keep you informed. Expect to see your IM client among others here.

The Windows Address Book has been replaced with a Contacts Query. Once your contacts are set up, you can e-mail or IM a pal directly from here. Even cooler, you can associate images with people who are in them, so you can use queries to search for images with certain contacts in them.

Expect Longhorn to give you one central portal for gaming on Windows. And we're not talking about the craptacular games that come with Windows either. We expect to see A-list games in there.

This handy window provides an easy way to sort, categorize, and even preview any digital photos or videos on your system.



Stacks are like context sensitive folders for your data. Here we did a search for all our Bob Dylan music, a nd then created stacks for each Album. This is completely independent of the folder structure; the actual MP3s are spread all over our hard drive.

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LiteOn CDRW 52x24x52x Drive
GeForce4 Ti4200 64MB AGP 8X Video Card
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512MB DDR SDRAM (PC3200 400MHz CAS2)
80GB Western Digital 7200 RPM Ultra ATA/100 Hard Drive
Samsung DVD/CDRW Combo 16X48X24X48X Drive
GeForce FX 5950 Ultra 256MB AGP 8X Video Card
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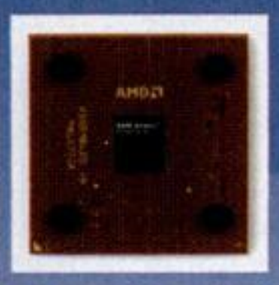
Windows XP Professional



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Mach L

Too Good To Be True?

Flamboyant, cocky, and loaded with intrigue, L Computers' over-designed systems have commanded attention... and controversy. We convinced the PC maker to send us a Mach L system in order to get to the bottom of the mystery.

BY GORDON UNG AND GEORGE JONES

Reebok, Toyota, and Coca Cola ads aside, Miguel Liebermann, a former commercial director, is more like us than we ever would've imagined. In the late 1990s, while still a director, Liebermann had finally had it with his laptop's lackluster performance, so he took action the *Maximum PC* way: With the help of Taiwanese manufacturer Clevo, Liebermann custom-designed his own high-powered notebook. As luck would have it, his spec became an instant hit with the film-studio crowd. Thus began Liebermann's new career. Today he is the CEO of L Computers, a business committed to building and selling beyond-the-pale PCs.

Flashy, ostentatious, and flush with the promise of unbridled PC power and an over-the-top aesthetic, L's web site (www.go-l.com) instantly generated an avalanche of attention as soon as it went live. Almost as quickly, a small but vocal minority of skeptics set about questioning the veracity of the company's claims. In the end, all the hoopla made this upstart manufacturer's launch feel more like the release of a Britney Spears album than a desktop system.

In *Maximum PC's* eight-year history, we've never received so many reader requests for us to review a single product. We had no choice but to request that L Computers send us the finest PC configuration it could muster. What arrived was a prototype preview version of its Mach L 3.8 PC, which inexplicably lacked several of the much-hyped technologies pimped on the web site (more on this later), but was nonetheless impressively spec'd.

continued→

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At -21° Celsius, the Mach L 3.8 ticks along at a smoking 3.8GHz.

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Buried deep inside the black Darth Vader-esque Asetek Vapochill case lies a 3.2GHz Pentium 4. L would have included the more powerful Pentium 4 Extreme Edition CPU, but blames Intel for not yet making the chips available to the company.

The inclusion of Vapochill's extreme phase-change cooling system is an overt declaration of L's extreme PC design philosophy. Like the freezer you have at home, the Vapochill case uses a condenser and coils to chill the CPU to -20 degrees Celsius. Consequently, L has been able to notch the P4 up to an impressive 3.8GHz by running the frontside bus at 948MHz instead of the stock 800MHz.

Dolemite is a rock and not a '70s icon?: The customized L on every machine is purportedly cut from marble, granite, quartz, sandstone, conglomerate, breccia, volcanic breccia, pegmatite, porphyry, granodiorite, gabbro, ultramafic rock, syenite, diorite, quartzite, schist, gneiss, obsidian, chert, tuff, felsite, andesite, basalt, limestone, dolomite, shale, slate, serpentine, or talc. How to choose?

The CPU is paired with a whopping 2GB of OCZ PC4200 RAM running at CL3, and a striped RAID 0 array of four 18GB 15,000rpm SCSI drives plugged into an Adaptec 29320 Ultra 320 controller. The quad RAID is augmented by a large 250GB Western Digital WD2500JB parallel ATA drive. For graphics duties, L tapped ATI's current über-card, the Radeon 9800 XT. Audio is handled by a standard Sound Blaster Audigy 2 card. All this is plugged into an Asus PC800-E Deluxe motherboard using Intel's 875P chipset.

Cosmetically, the Mach L series borrows liberally from PC modding aesthetics. Intentionally or otherwise, the Mach L's signature feature, a futuristic high-res LCD screen that sits in place of the system's three optical drives, pays homage to the PC *Fast and Furious* set. It's not exactly practical, as you're forced to resort to a USB optical drive, but it's really cool. The computer we received featured a smaller, simpler, but still pretty neato two-bay CrystalFontz display that we could program with our own messages and use to monitor hard drive space, system temperature, and memory usage.

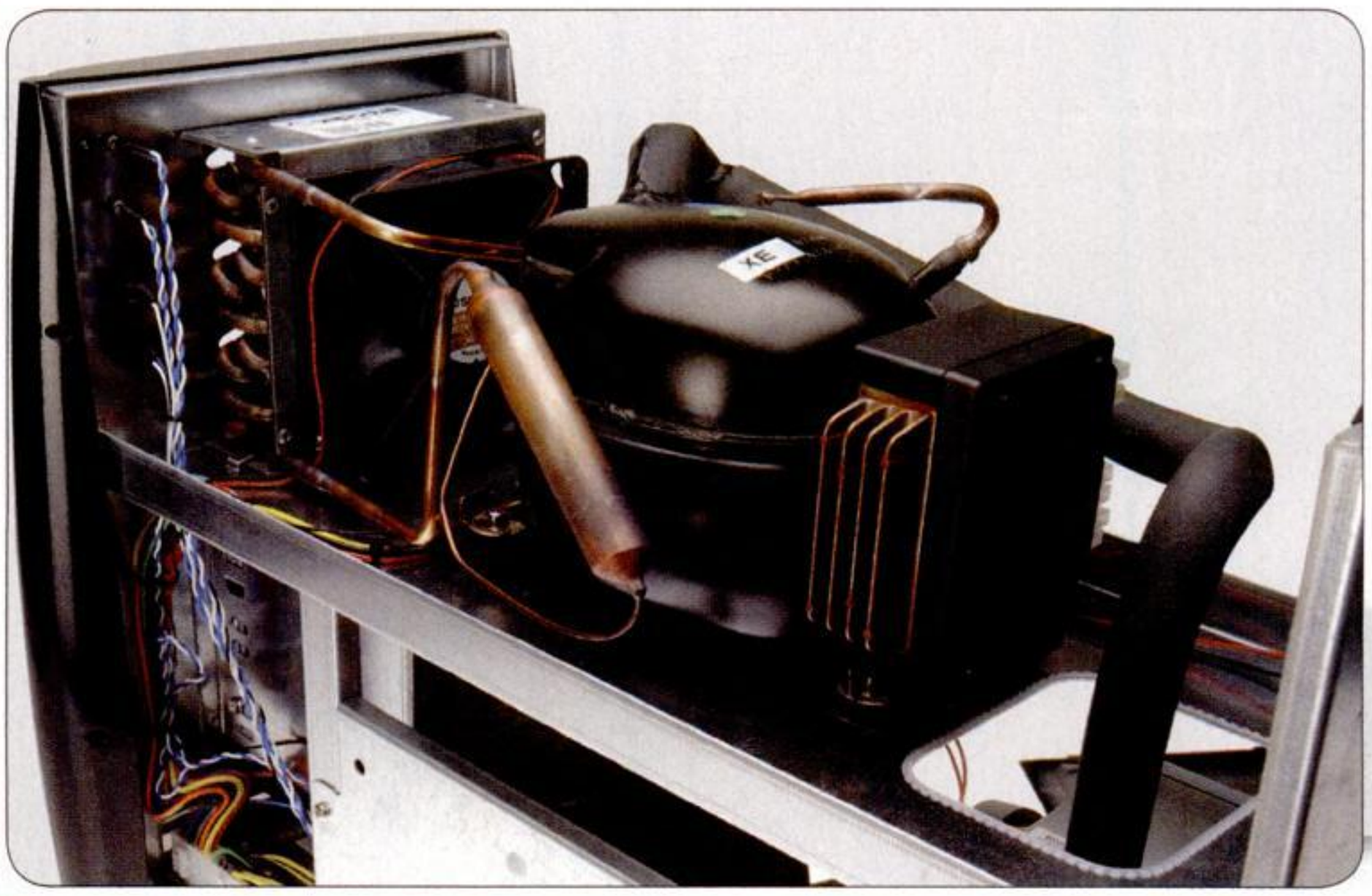
The Mach L's distinctive tweaks and modifications even extend to the OS. On boot, our L computer exhibited a re-skinned desktop that took us by surprise with its Apple OS X-style large, translucent icons. Don't worry, Windows XP is still underneath it all; we're just unaccustomed to seeing an OEM system with such a drastically different-looking interface, especially given Microsoft's iron-fisted insistence upon OS uniformity among OEMs. When queried about this unexpected divergence, L said that its PC builders are "very close to Microsoft," and that the company strictly follows Microsoft's policies, design, and integration guidelines.

All told, these modifications, tweaks, and design flourishes amount to an intimidating-looking PC that's striking in both appearance and performance.

We're pretty sure it's pronounced Aztec: If you think you've seen this case before, you have. It's one of Asetek's Vapochill Case Coolers, and it's actually fairly quiet considering the amount of cooling you get.

To be sure, successfully launching a PC manufacturing operation entails more than just looks and speed, but by "streeting up" its desktop and loading its web site with fancy-sounding names like PuRAM and SuperBIOS, L Computers has successfully captured the public's attention.

In the process, though, the company has generated a typically vehement Internet anti-fanboy reaction. One site, for example—**www.plex.us** has devoted an entire section to the dogged dismissal of L's credibility. For its part, L's response to criticism typifies the company's brash attitude, and will do little to quell the controversy. "When something new or revolutionary comes out," Liebermann opined via e-mail, "skepticism is a typical and normal reaction... Some refuse to admit that someone else but them is finally doing clever marketing in the PC world, some refuse to admit there is finally a comparable high-end computer manufacturer, and some refuse to admit the fact that



Aunt Fannie wishes her icebox had this kind of performance: CPUs put out more heat per square centimeter than nuclear reactors. Fortunately, the compact and efficient cooler in the top of the Mach L keeps the heat in check.

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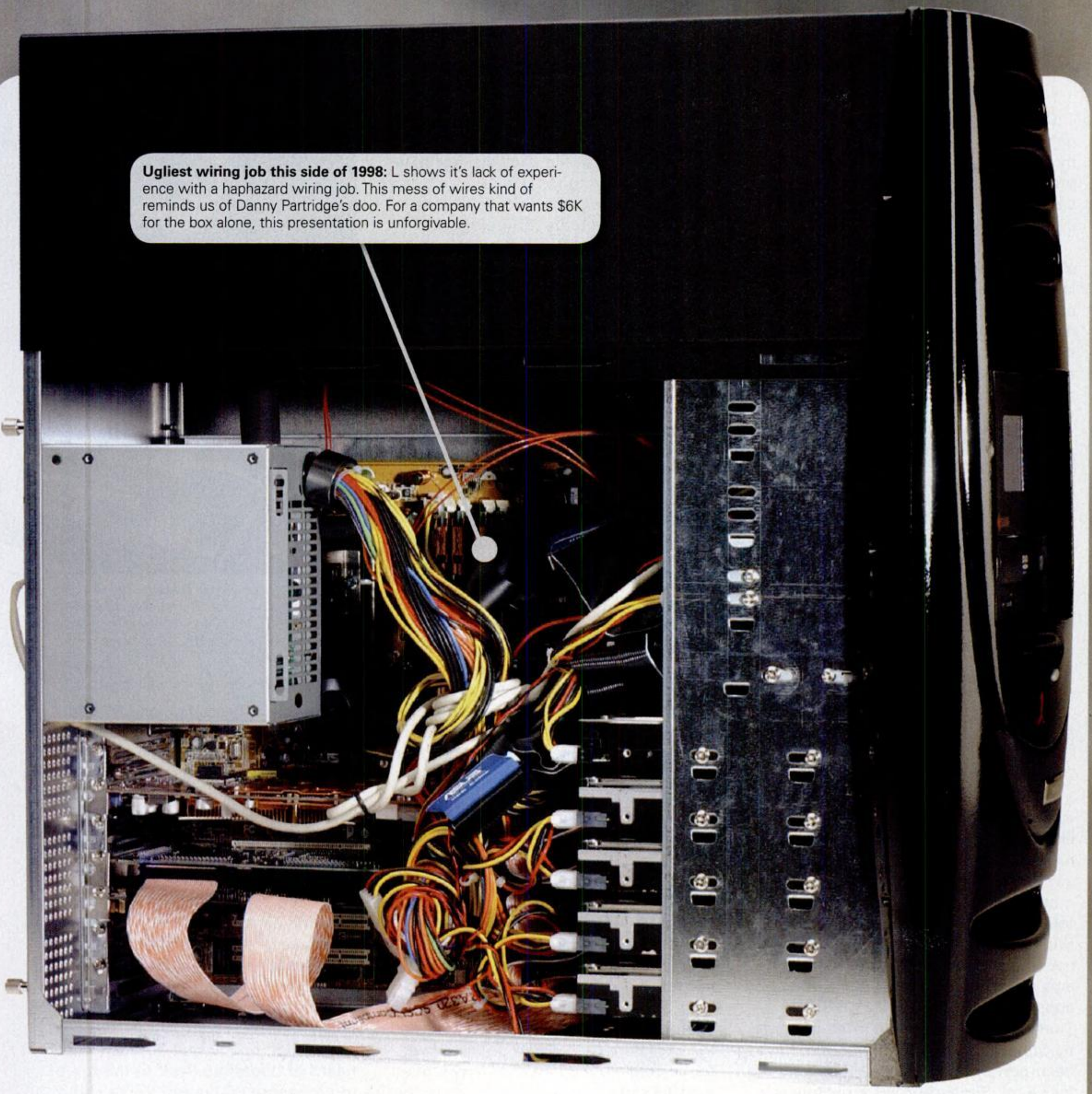

Ugliest wiring job this side of 1998: L shows it's lack of experience with a haphazard wiring job. This mess of wires kind of reminds us of Danny Partridge's doo. For a company that wants $6K for the box alone, this presentation is unforgivable.

the world of computers has changed (a long time ago)." His e-mail closes with a fiery parting shot: "We act upon people's reaction to [our products], not the comments of those who have not seen them or have nothing better to do with their time than to criticize what they know positively nothing about. It's called ignorance, the most tragic of human faults."

That's tough talk, particularly in an industry with almost reverential deference to its customers.

Fact or Fiction?

In a move that's sure to embolden skeptics, the company neglected to include one of its most hyped features in the Mach L it sent us: the PuRAM drive. Solid-state flash RAM that would undoubtedly boost system performance and boot time, L's PuRAM drives range in size from the typical 4GB configuration—enough space to accommodate an OS and program files—to an extravagant 80GB, which will cost a consumer close to $80,000.

continued→

Specifications

CPU	3.2GHz P4 OC'd to 3.8GHz
RAM	1GB OCZ DDR400 OC'd to 474MHz
Storage	Four 15K Seagate Cheetahs; a 250GB WD1200JB
Videocard	ATI Radeon 9800 XT

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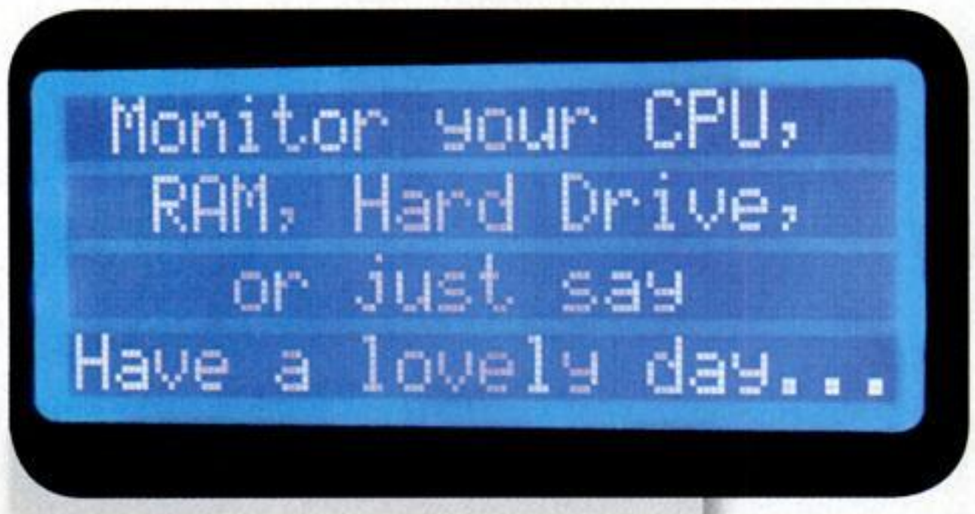
Hardcore Hardware

Despite repeated requests, L failed to get us a PuRAM unit to experiment with by press time. The company says it had problems pulling together the various components from the different suppliers it uses for these devices.

Thankfully, our Mach L 3.8 did come with another RAM drive promised for all large-memory configurations. By using about 400MB of system RAM as an extra drive, the Mach L 3.8 is able to cache system temp files, cookies, and other such items in system RAM to help speed performance and eliminate clutter.

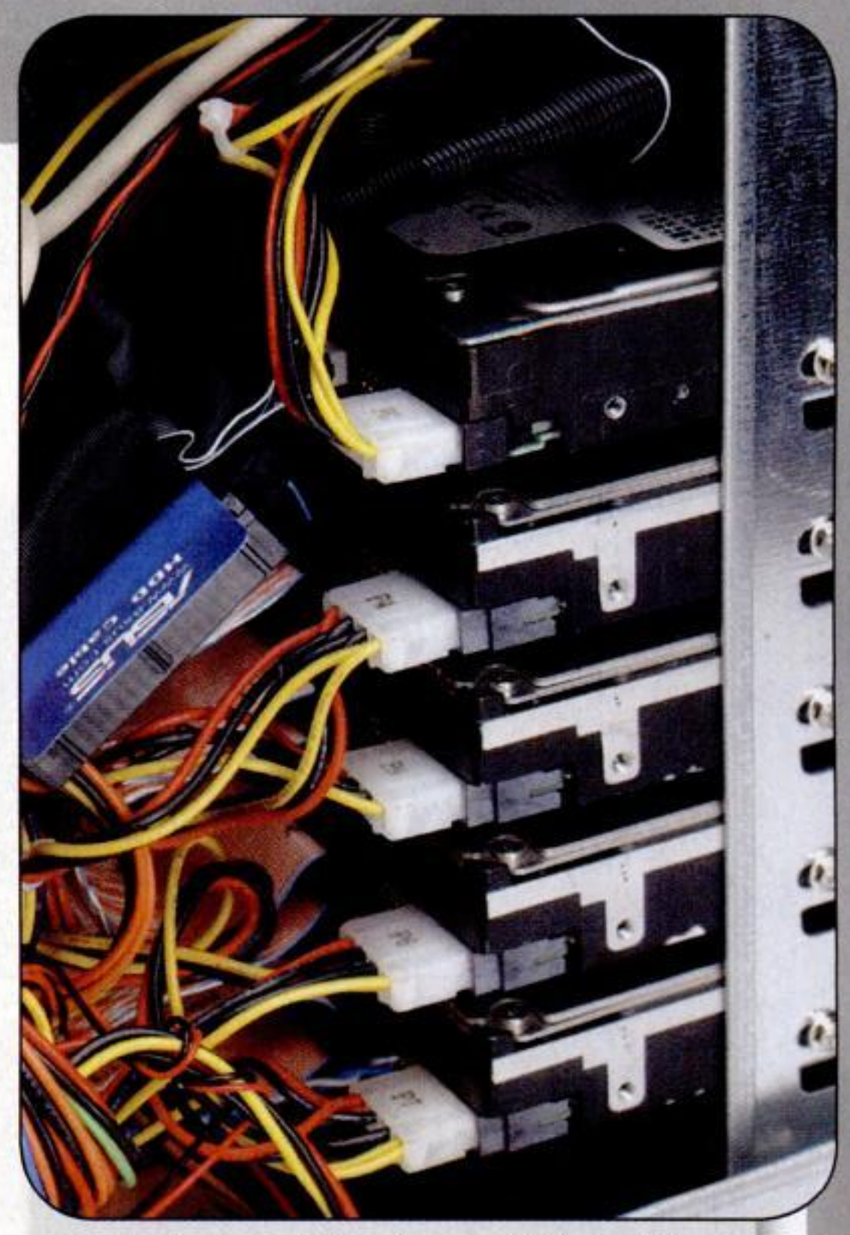


This space available: A CrystalFontz display running off the PC's serial port lets you monitor critical system stats, or earn extra revenue: epc-frontbezel-adverstising.com.

Available or not, proprietary or otherwise, components and technologies like PuRAM, SuperBIOS, and CacheFlow have played a large part in L's ability to garner so much attention. Interestingly, many of these capital-lettered names refer to already-existing technology. The SuperBIOS, for example, is an OS-level tweak that allows the PC to monitor and adjust the clock speed and voltages of the CPU and RAM on the fly. That's not new; high-end motherboards by SuperMicro and other vendors have been performing the same functions for years. Similarly, the CacheFlow is described as caching frequently used files in RAM instead of the hard drive in order to boost system performance and increase speed in file copying. Again, not particularly daring.

What is daring, however, is L's proper-name approach to its technology. Up until now, most PC manufacturers have preferred to keep it real, targeting fickle hardware junkies with generic terms for readily available technologies and products. Granted, L is not alone in its outlandish naming conventions. Consider nVidia's "UltraShadow Technology" and ATI's "Hyper Z III Technology." If L succeeds in its mission, we can only expect more of this.

But L's smart marketing may wind up getting the company into trouble down the road. The L web site lists CacheFlow as a trademark of L Computers, but a search of the U.S. Patent and Trademark Office shows the term as being registered to Blue Coat Systems in Sunnyvale, California. Blue Coat representatives said they've never heard of L Computers. This wouldn't be the first time trademarks got crossed, but it's still cause for concern. Is L's marketing arm writing checks the production facilities can't cash?



Lots of drives, little storage: We're a little confused by L's decision to run a quad RAID using 18GB 15K Cheetah drives as there are certainly larger 15K SCSI drives on the market today.

Welcome to L

So what's our take on the phenomenon? It's a tough call, but one thing we can say definitively is that although L Computers has much potential, the company has a long way to go in terms of PC design and configuration. We like the OS tweaks and the execution of the RAM drive, but we found an alarming lack of airflow around the RAID array. We're also extremely concerned with the interior wiring job, which was messy at best. High-end PC users don't just expect wiring jobs tighter than a snare drum, they demand it. These same users will quickly reject the embarrassing rat's nest we found.

Admittedly, our Mach L 3.8 was a rapidly configured and delivered prototype, and it's still early in the game for this young company. So we'll give L the benefit of the doubt. After all, the company's machine performed quite well in our tests (see In the Lab below), and some of its features are well worth celebrating. Also of note is L's modder-inspired approach, which embraces looks, power, and coolness.

Can a company that no one's ever heard of bootstrap itself to the top of the hardcore PC crowd? We're about to find out. ■

IN THE LAB

Say what you will about L Computers, but the company's flagship PC, the Mach L 3.8, posts big numbers with its 420MHz speed advantage.

In CPU-constrained benchmarks, the overclocked Mach L 3.8 ran faster than HyperSonic's SonicBoom (reviewed on page 68), a PC featuring a 3.2GHz Pentium 4 Extreme Edition overclocked to 3.38GHz. In *Premiere Pro*, the Mach L 3.8 sprinted about 8 percent faster then the SonicBoom (which itself slammed Athlon 64 FX boxes), and it performed about 9 percent faster in our *Photoshop* tests. That's pretty damn fast.

Oddly, we saw virtually no difference with regards to gaming performance. Packing the same videocard as the SonicBoom but carrying a clock speed advantage, the Mach L 3.8 finished dead even with its competitor in *Jedi Academy* and only about 4 percent faster in *Halo*.

We're always concerned about heavily overclocked systems so we ran the Mach L 3.8 through a nonstop three-day burn-in to see if the processor would give up the ghost. It didn't crash once. Vapochill gets big props here for a job well done.

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★★★★★ GAMESPY

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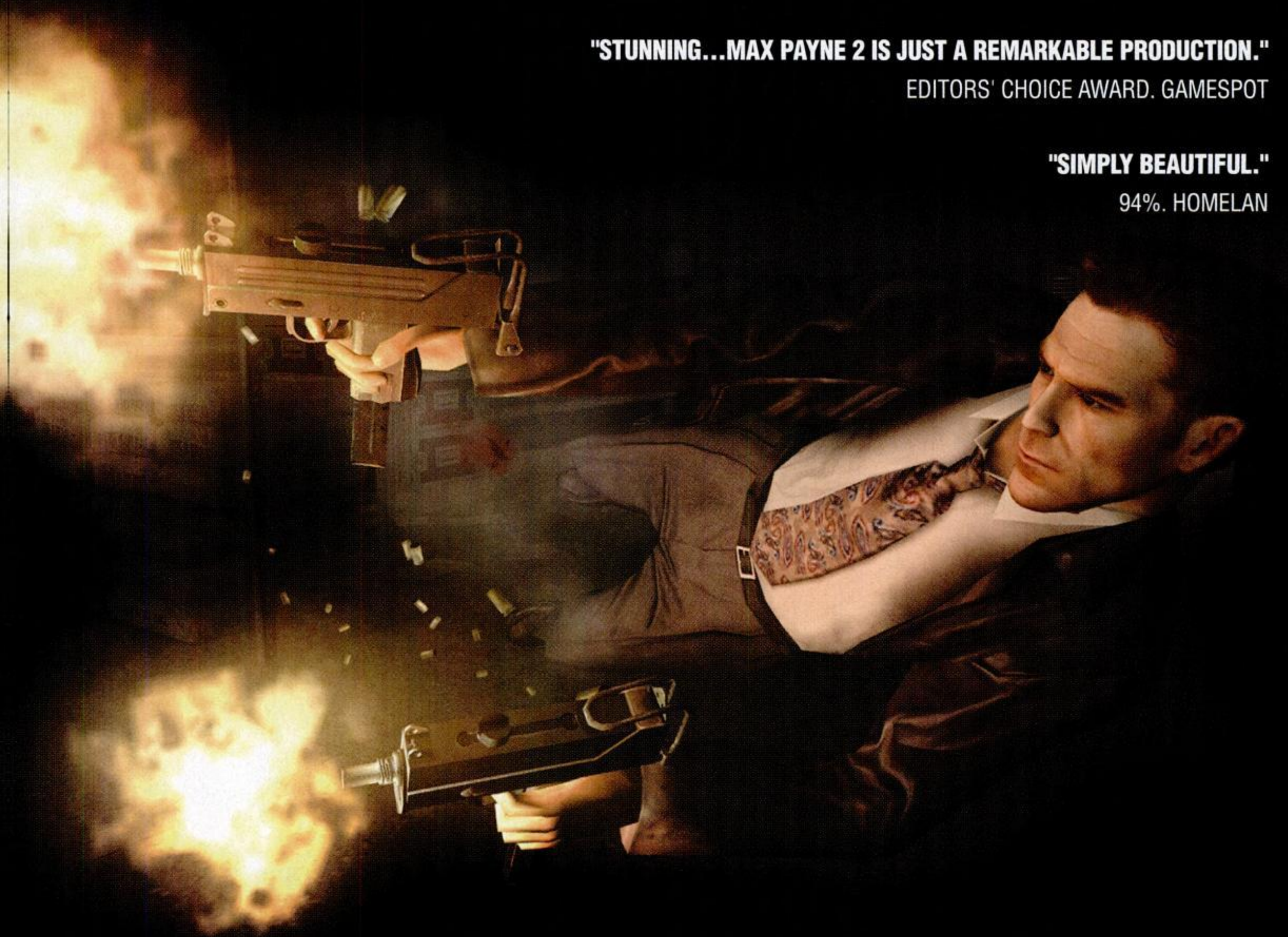
EDITORS' CHOICE AWARD. GAMESPOT

"SIMPLY BEAUTIFUL."
94%. HOMELAN



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MAXIMUM PC's Second Annual SOFTY AWARDS

We count down the 10 most amazing, most indispensable applications and utilities of 2003

Lock up a group of simple, honest, hard-working *Maximum PC* editors in an unventilated conference room with nothing but a brown dry-erase marker and a cup full of Sweet 'N' Low packets, and you've got problems. Lock up the same group in the same room with the same scant resources and force them to deliberate and rank the year's best software applications and utilities, and the tensions rapidly escalate. Trust us.

The rules were simple: Rather than focus on each of the 17,000 software genres out there, each editor was instructed to nominate a favorite software app, based on real-world criteria: functionality, power, ease of use, coolness.

Unfortunately, the process became, er, complicated. When Disc Editor Josh Norem called Tech Editor Will Smith a "stupid doody-face" for dismissing his Softy nominee as "crap," the word *regression* came to mind. For that matter, so did the word bologna—which best describes the paint-peeling aroma that filled the room at the end of our second annual Softy deliberations.

Thankfully, we do this only once a year. Wait? What's that? We're going to do a Maximum PC Game of the Year awards next month?

We'd best get soft in a hurry…

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10 Microsoft PowerToys for Windows XP

Ah, *PowerToys*. Originally released as a set of free add-ons for Windows 95, this trusty little package of tweaks has seen us through three separate OS revisions, yet remains just as useful as it was years ago. The fact that Microsoft's engineers are still producing the toolkit is a testament to its popularity and sheer usefulness.

PowerToys' 10-piece suite consists of tools we use every day and mini-apps that are just plain cool. Most widely used in the *Maximum PC* office is the *Alt-Tab Replacement* utility, which delivers a thumbnail preview of open apps in addition to the standard icons when we Alt-Tab. We also dig *Image Resizer*, which allows for the rapid resizing of images via the right-click menu. Then there's the ever-popular *TweakUI* for manipulating Windows XP's hidden UI features, and *Windows Desktop Manager*, which grants power users the ability to manage up to four virtual desktops from the taskbar.

We could gush on and on about *PowerToys*, but let's take a step back and contemplate its greater meaning as a gateway drug of sorts to the *Maximum PC* ethos. How many novice users have thrilled at the rush of excitement that *PowerToys'* "use at your own risk" warning evokes; and how many have gone on to become PC optimizers, customizers, and maximizers? Countless, we'd hazard to guess.

In the end, however, *PowerToys* wins a Softy simply for becoming an integral part of our software arsenal. We all use them, and so should you. They really are the proverbial "free lunch." B-U-R-P!

www.microsoft.com/PowerToys

Each of the *XP Power Toys* is useful in its own little way; *Image Resizer*, for example, makes image resizing a speedy two-click affair.

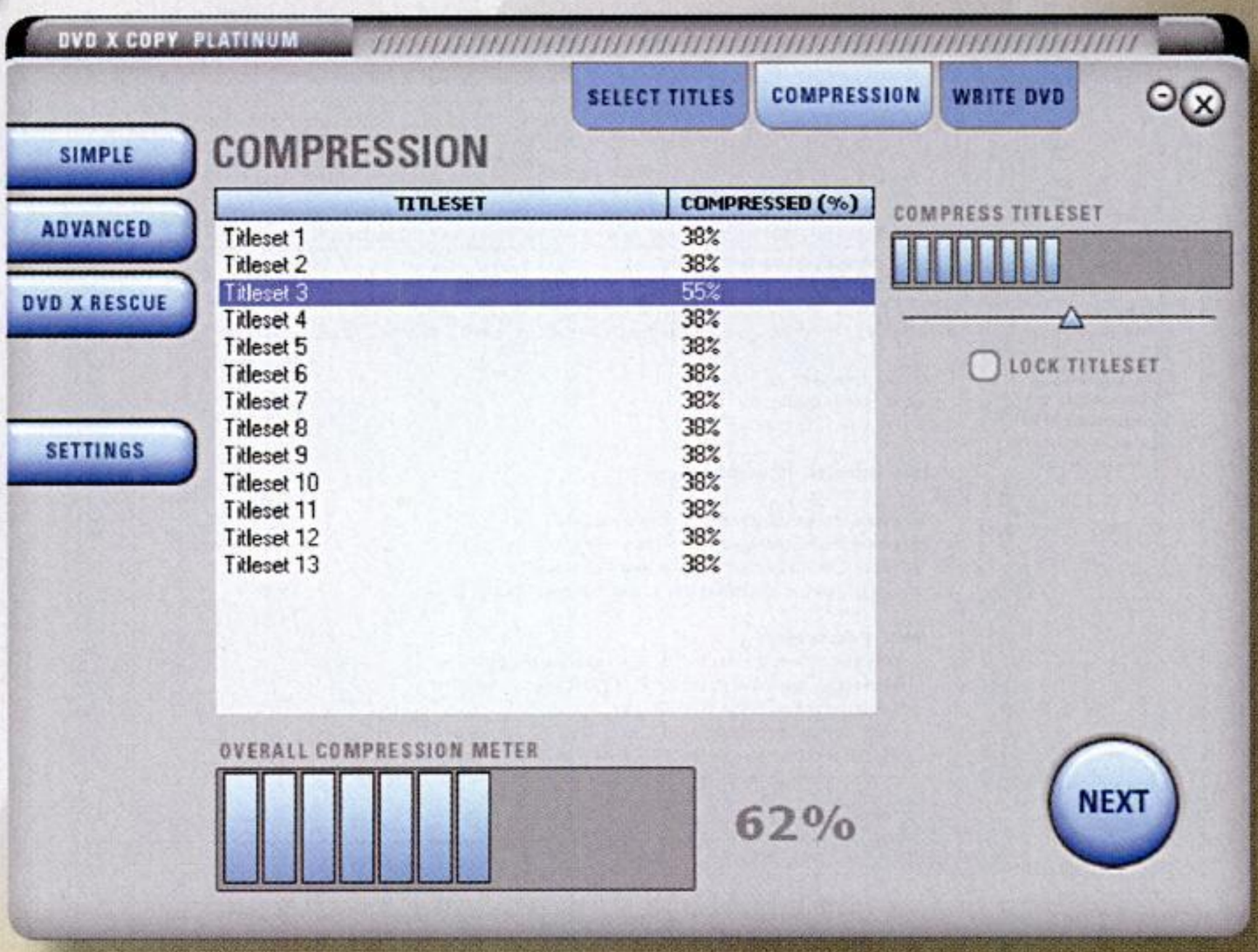
9 DVD X Copy Platinum

The killer application for DVD burners has arrived. Whether you want to preserve the entire contents of a dual-layer DVD movie onto two discs, or burn and churn multiple discs and compress them all onto one, *DVD X Copy Platinum* does it. You can even copy select feature sets of a DVD or tweak the level of compression on movies you back up.

Of course, the tricky question is: How legal and ethical is using *DVD X Copy Platinum*? While the legality is still being debated in the courts, the ethics shouldn't present a problem for anyone who truly covets his or her DVD collection, or whose kid just played Frisbee with a set of Criterion discs.

If you have a DVD burner and don't want to read through a 10-page FAQ on disc duping, *DVD X Copy Platinum* is a must-have. And sadly, you should probably get it before the outcome of the legal proceedings prevents its sale.

www.321studios.com.



With *DVD X Copy Platinum*, you can vary compression levels and select just the DVD features you want when you make your archival backups

8 Cakewalk Project 5 Soft Synth Workstation

Years ago, we got all gooey over Propellerhead's *Reason 2.0*, a pair of CD-ROMs that, upon installation, turned a PC into a giant electronic music creation studio, complete with mixer, patch bay, samplers, and outboard effects. Well now we're a hopeless puddle over *Project 5*, a similar software "studio environment" made by Cakewalk, a company that won a Softy award last year for its *Sonar 2* sequencer.

The most obvious application of *Project 5* is pattern-based music creation. Start with a drum track generated by the included nPulse modular drum synthesizer, drop a sampled bass-line loop over it, add a few layers of custom pads generated by the PSYN analog synth, and voilá—you're Moby. The knobs-and-buttons interface is so easy to use that *Project 5* makes a great experimental scratch pad for any kind of musician. Rudimentary song structures can be built, tweaked, and tortured within the software and used as a template for live recording later.

What hoists *Project 5* above *Reason* is its support for DXi and VST synths, plug-ins, and effects. This presents numerous possibilities for beefing up your sound with VST instruments, or integrating effects you've already come to know and love into *Project 5's* sound canvas.

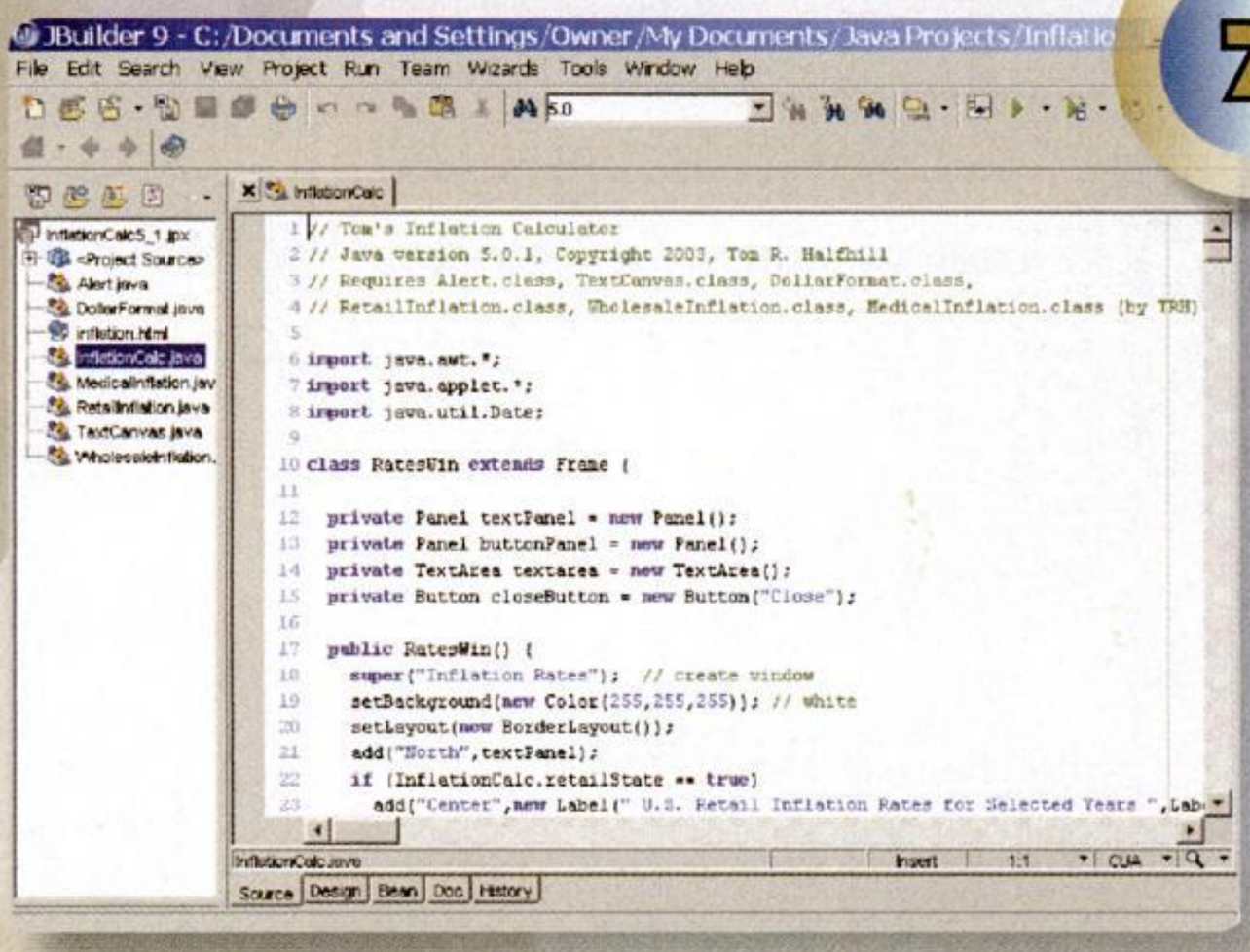
Note that *Project 5* doesn't record—if you want to jack in a guitar or vocal track and apply effects to the result, you're better off with a full-fledged sequencer like Cakewalk's *Sonar*. But as an all-in-one electronic music studio, *Project 5* is unparalleled. **www.cakewalk.com**

***Project 5* is the greatest thing that could happen to a budding musician, and the worst thing that could happen to your roommates.**

7 JBuilder

Maximum PC Fast Forward columnist Tom Halfhill fell in love with Borland's *JBuilder 9* in 2003, calling it "the only significant new application" he had used all year. We have to agree—*JBuilder* streamlines Java coding with a slick, graphical interface, application wizards that accelerate the coding process, and an integrated source-code editor that allows you to easily browse and investigate your programs.

Borland's recently released new version, *JBuilder X*, costs close to $1,000, but don't let that deter you. Hobby Java developers can download and use the Personal Version of *JBuilder 9* for free. It sports many of the same features as the professional version, which makes this development tool hard to beat for anyone who programs in Java… or anyone who wants to learn Java. **www.borland.com**


JBuilder 9 - C:/Documents and Settings/Owner/My Documents/Java Projects/Inflatio
File Edit Search View Project Run Team Wizards Tools Window Help
InflationCalc
// Tom's Inflation Calculator
// Java version 5.0.1, Copyright 2003, Tom R. Halfhill
// Requires Alert.class, TextCanvas.class, DollarFormat.class,
// RetailInflation.class, WholesaleInflation.class, MedicalInflation.class (by TRH)
import java.awt.*;
import java.applet.*;
import java.util.Date;
class RatesWin extends Frame {
private Panel textPanel = new Panel();
private Panel buttonPanel = new Panel();
private TextArea textarea = new TextArea();
private Button closeButton = new Button("Close");
public RatesWin() {
super("Inflation Rates"); // create window
setBackground(new Color(255,255,255)); // white
setLayout(new BorderLayout());
add("North",textPanel);
if (InflationCalc.retailState == true)
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Get your Java-development on with *JBuilder's* sleek intuitive source-code editor.

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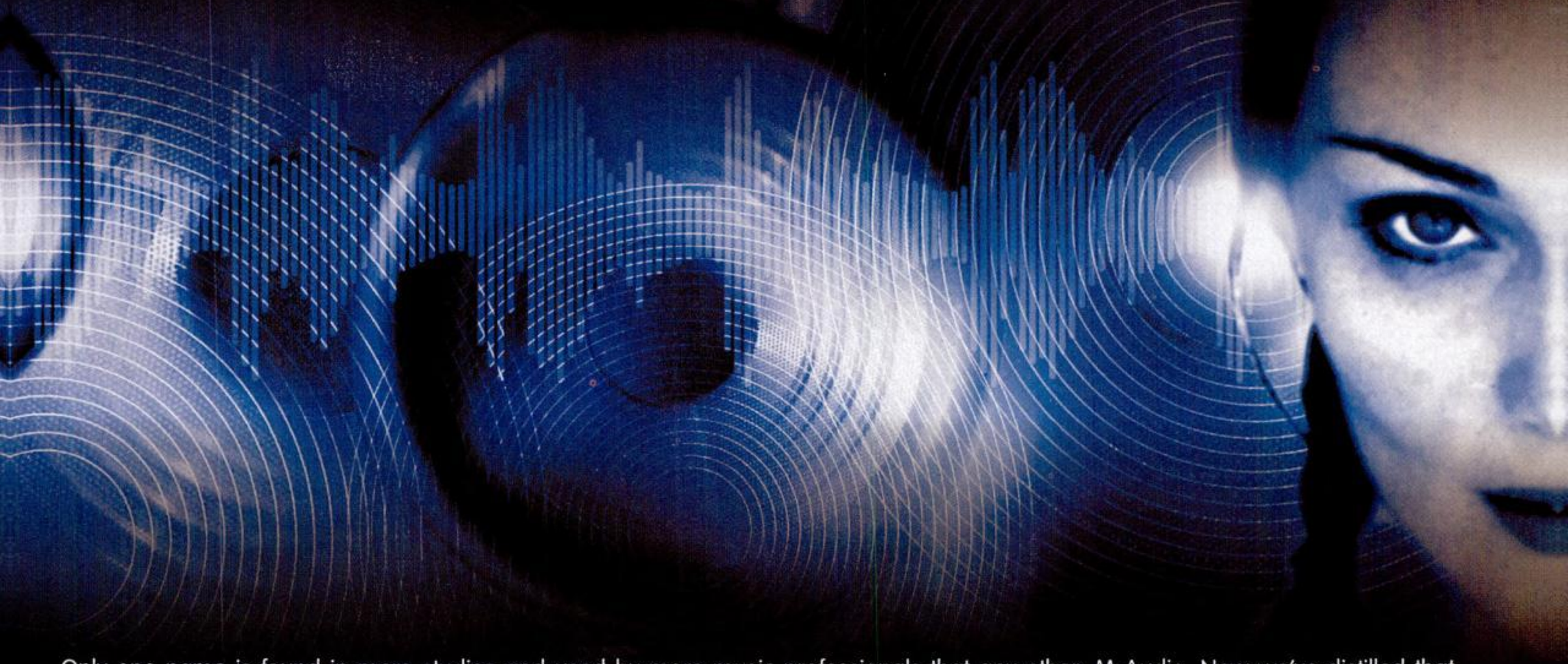
Pro audio isn't just for pros anymore



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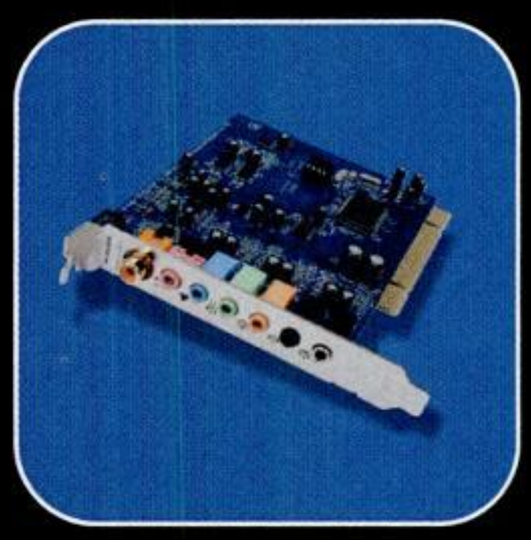

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professional 24-bit/96kHz recording

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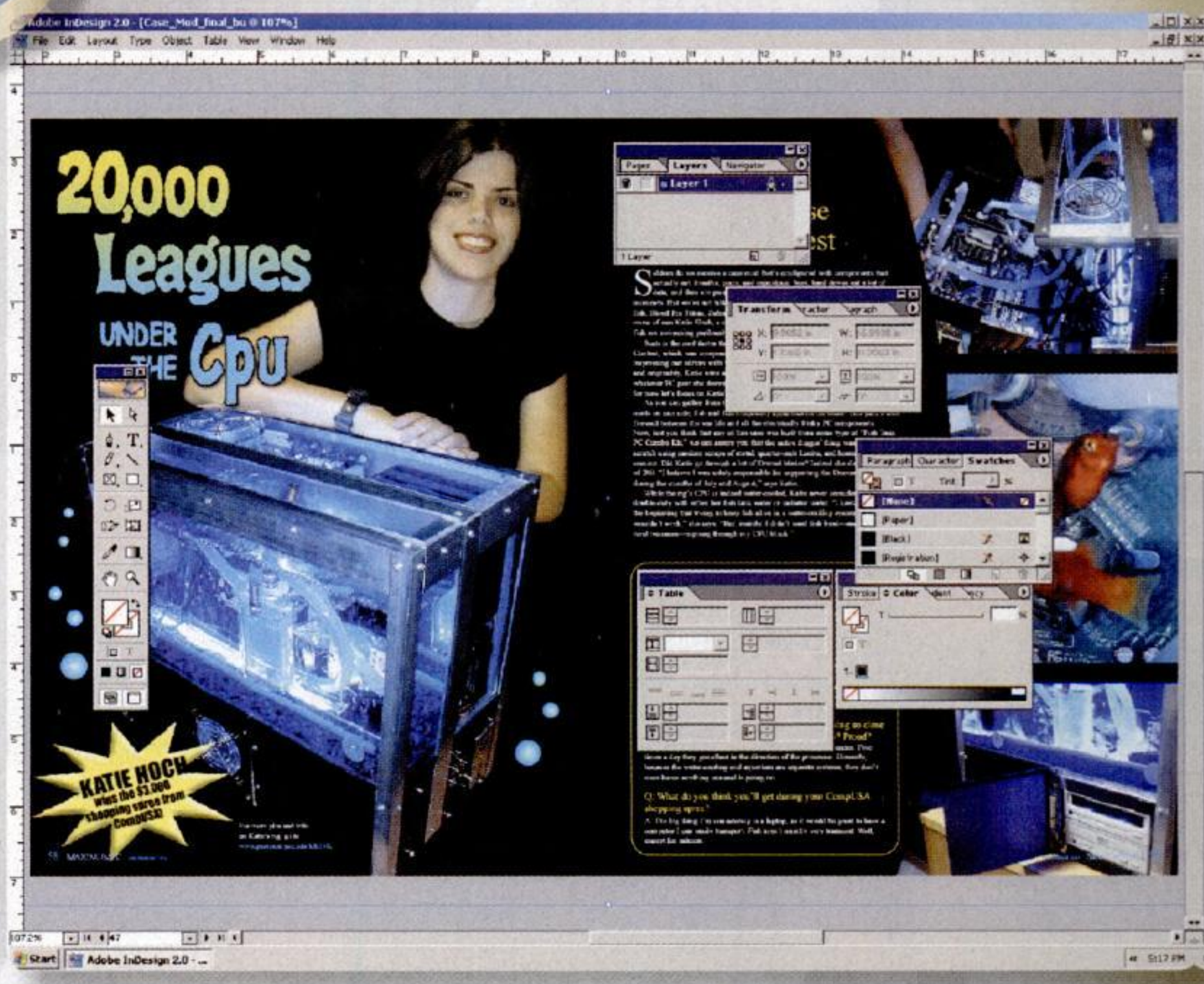
6 Adobe InDesign 2.0

This page layout program doesn't just kick ass, it kicks *specific* ass. Or, rather, asses, plural—the asses of all the downtrodden sods at Quark Incorporated, the people behind Quark *Xpress*.

There's a battle brewing in the graphic design community. On one side, you have all the page layout artists who still use *Xpress*. No one really "likes" *Xpress*; the program is merely tolerated because it's an entrenched industry standard. On the other side, you have daring mavericks like the art directors at our publishing company, Future Network USA. This year we all switched to *InDesign* because it's a superior package.

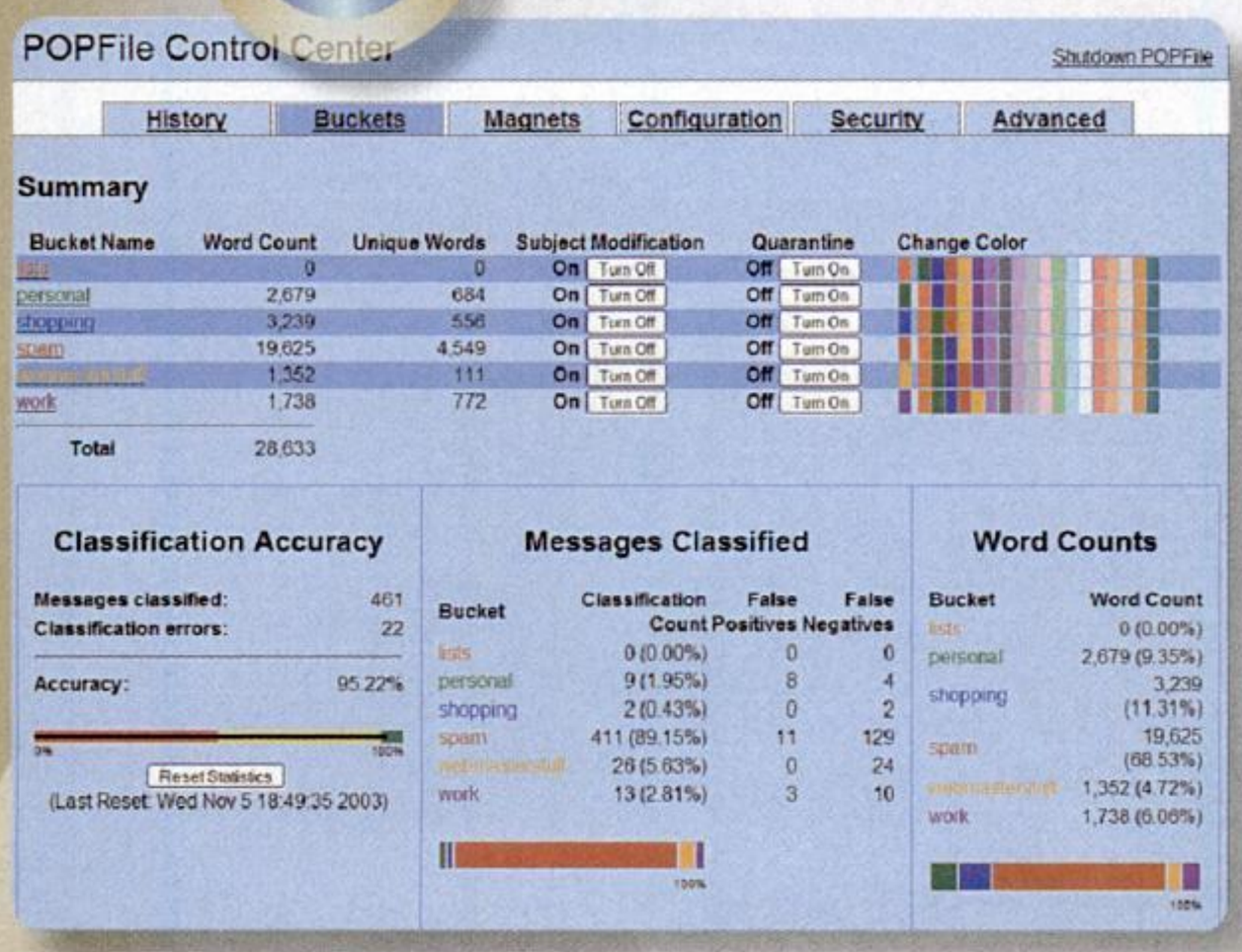
For example, its various image preview modes are not only fast, they're also much more accurate than *Xpress'*—you'll feel like you're viewing image files natively in *Photoshop*, which should come as no surprise given *InDesign's* Adobe pedigree. *InDesign* also offers far better text features—never before have we enjoyed such control over strokes and drop shadows. We've also never experienced such sublime control over tables, which can be seamlessly imported from *Excel* and *Word*. *InDesign* lets you import native *Photoshop* and *Illustrator* files that retain all their layers. Finally, *InDesign* trumps *Xpress* with righteous transparency effects that can be applied to any graphic or object.

www.adobe.com



Not only does *InDesign* boast a floating palette interface that will be immediately recognizable to all *Photoshop* users, its high-res preview mode is almost as sharp as that of its image-editing cousin! Perhaps even better, Mac-based *InDesign* files like the one you see here open perfectly on our PCs.

5 POPFile


POPFile Control Center
Shutdown POPFile
History
Buckets
Magnets
Configuration
Security
Advanced
Summary
Bucket Name | Word Count | Unique Words | Subject Modification | Quarantine | Change Color
lists 0 0 On Turn Off Off Turn On
personal 2,679 684 On Turn Off Off Turn On
shopping 3,239 556 On Turn Off Off Turn On
spam 19,625 4,549 On Turn Off Off Turn On
work 1,738 772 On Turn Off Off Turn On
Total 28,633
Classification Accuracy
Messages classified: 461
Classification errors: 22
Accuracy: 95.22%
Reset Statistics
(Last Reset: Wed Nov 5 18:49:35 2003)
Messages Classified
Bucket | Classification Count | False Positives | False Negatives
lists 0 (0.00%) 0 0
personal 9 (1.95%) 8 4
shopping 2 (0.43%) 0 2
spam 411 (89.15%) 11 129
work 13 (2.81%) 3 10
Word Counts
Bucket | Word Count
lists 0 (0.00%)
personal 2,679 (9.35%)
shopping 3,239 (11.31%)
spam 19,625 (68.53%)
work 1,738 (6.06%)

Spam-sufferers, rejoice! POPFile will categorize your junk e-mail and banish it to the nether regions of your Inbox.

Loads of anti-spam utilities are available today. There are two in particular we've been partial to in the past—*Inboxer* and *SpamPal*—because of their ease-of-use and capacity to filter unsolicited e-mail. But let us not forget *POPFile*. It may be more difficult to configure and take a little extra effort to train, but once you've mastered the app, you'll be amazed at its power and unique capabilities.

POPFile sits between your e-mail server and client, just like many other spam-filtering utilities. It uses Bayesian filtering techniques to compare incoming e-mail to keywords and phrases, and the program ends up tailoring itself to the spam you typically receive. Keyword filtering allows *POPFile* to make more accurate decisions and adjust itself to combat new spam threats faster than other anti-spam programs.

But what really makes *POPFile* special is its all-around usefulness. Instead of filtering just spam, *POPFile* lets you set up additional categories—called buckets—which you can use to sort any type of e-mail. In addition to the spam bucket, we set up buckets for personal e-mail, work-related e-mail, and mailing lists we belong to. After a few days, the app was accurately filtering *all* our incoming messages.

To train *POPFile*, you open the interface in your web browser and select a bucket for each e-mail you receive. The more buckets you use, the longer it takes to begin filtering accurately. Still, we were surprised that with five buckets, it took less than one full day for the program to filter our e-mail with 95 percent accuracy. If you take the time to reclassify any false positives or negatives you get, *POPFile* becomes more and more precise.

popfile.sourceforge.net.

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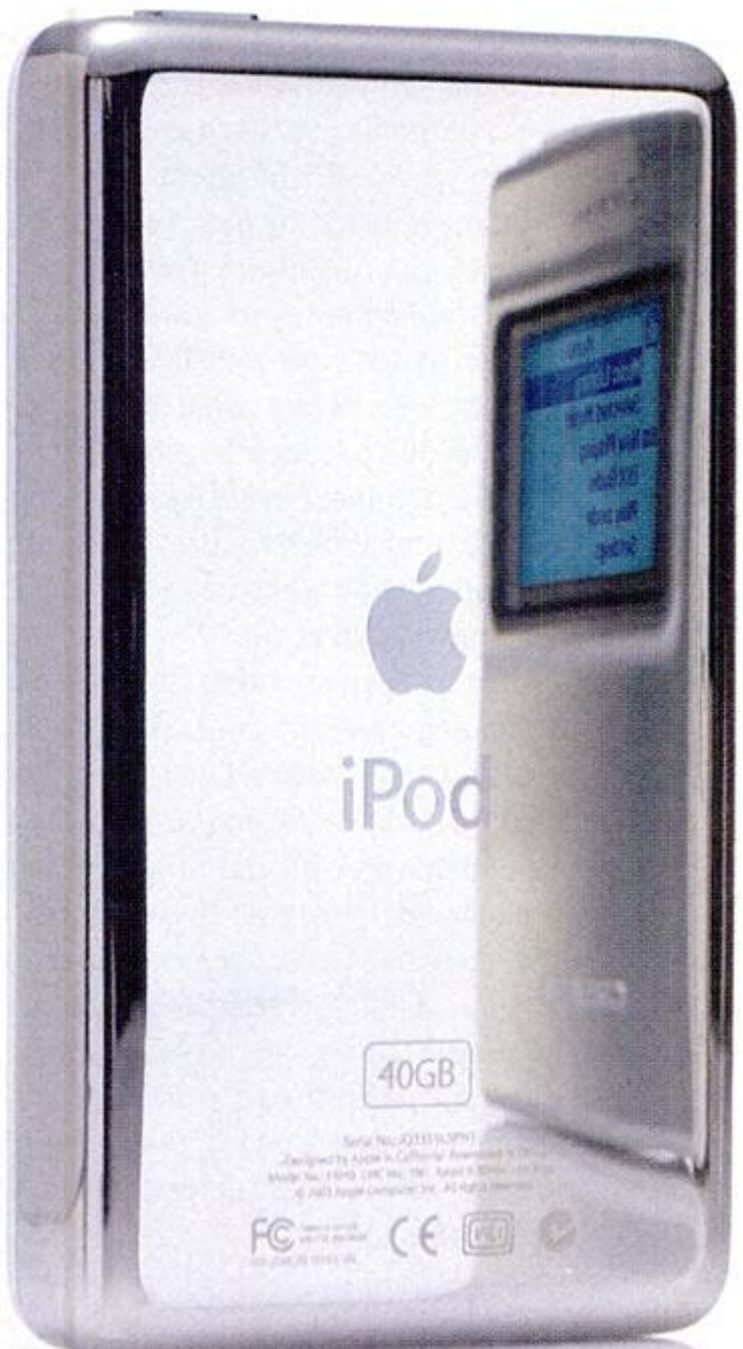
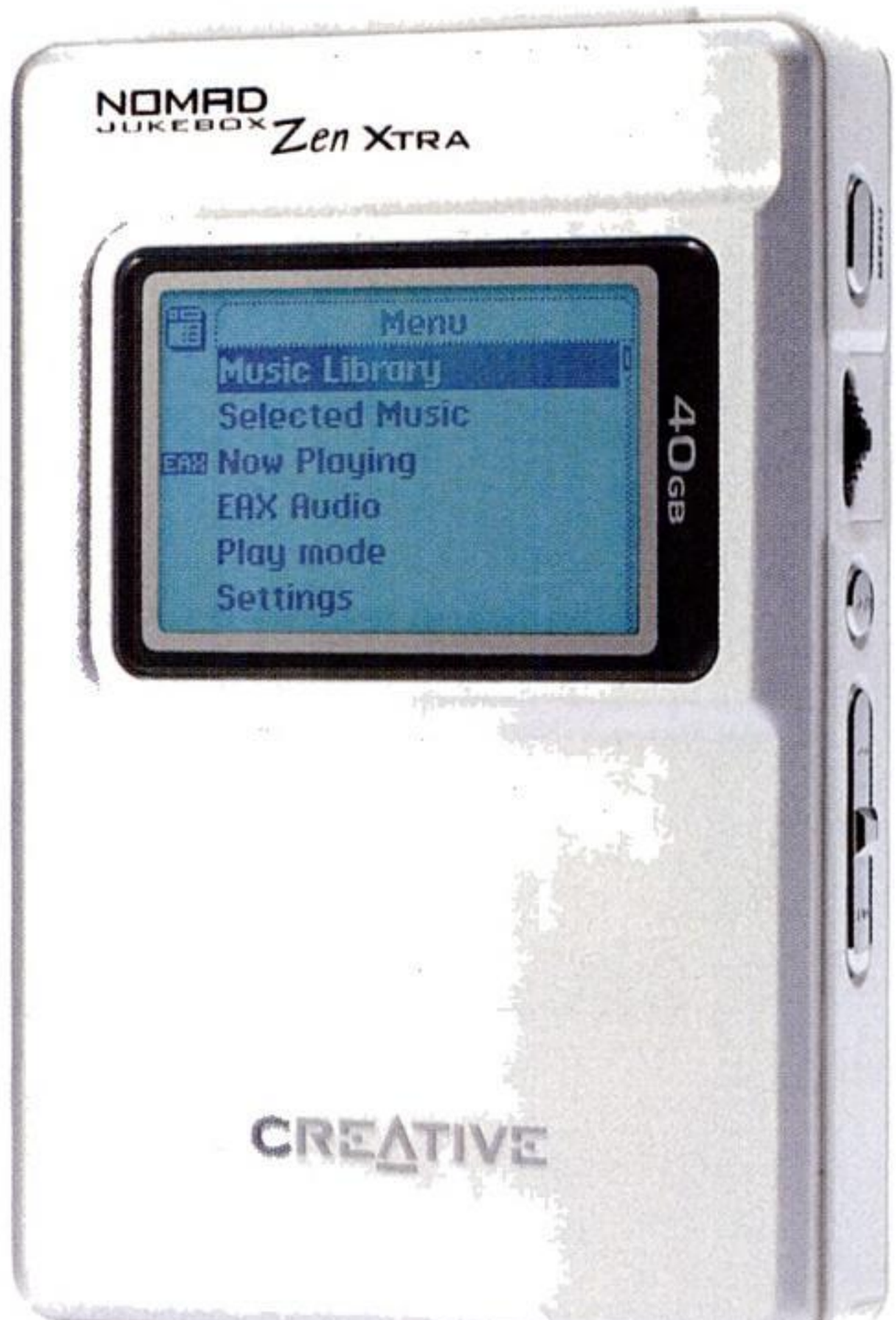
Not just another pretty face





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CREATIVE NOMAD JUKEBOX Zen XTRA

...and it costs 30% less than iPod.*

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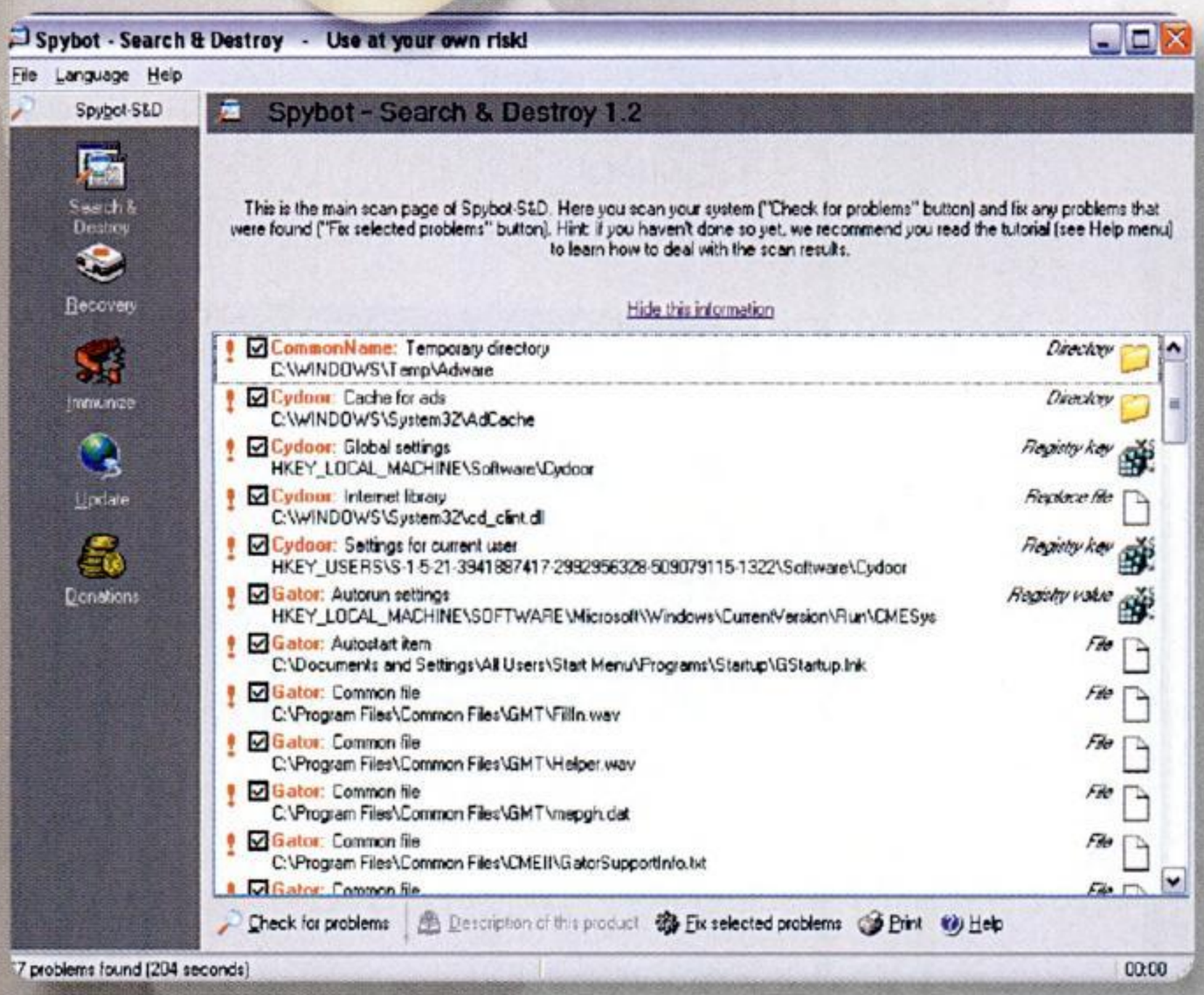
4 Spybot Search and Destroy



How did our PC become so infected by so much adware? Go *Spybot*, go!

The first time we ran *Spybot Search and Destroy*, we felt like Neo when he saw the Matrix code all around him for the first time. We simply couldn't believe how much spyware, adware, and tracking software had been installed on our PCs without our knowledge. We thought the antivirus and firewall software we were running was keeping us safe, but we were living in a dream world.

Then we found *Spybot*. This free utility conducts a three-finger probe into your PC's every orifice, rooting out spyware, Trojans, tracking devices, and any other malicious code that has surreptitiously set up camp on your hard drive. Once the app has located and eradicated your system's detritus, *Spybot* lets you "immunize" your PC from such threats in the future, effectively preventing whatever you removed from ever showing up again.

Just as spyware companies are always developing new and clever ways to track your browsing habits without your knowledge, *Spybot's* threat-detection abilities are continually updated as well. Its "threat" database is as thick and comprehensive as Ben Affleck's little black book, and updated just as often.

Sure, other spyware utilities are on the market, but we're awarding *Spybot* the Softy because it's easy to use, works as advertised, is frequently updated, and is free. Every *Maximum PC* editor runs this app at least once a week.

spybot.eon.net.au

3 iTunes

Steve Jobs calls it the "best application ever written for Windows." While we're loath to second that appraisal, we'll nonetheless admit that *iTunes* is a superb, easy-to-use digital jukebox that doesn't skimp on features. For the low, low price of absolutely free, you get intelligent music file management and playback, a convenient red carpet to Internet radio streams and the iTunes music store, CD ripping with support for error-correction, automatic tagging, and free encoding to MP3 or AAC. And if you own an iPod, the close drag-and-drop integration you get with *iTunes* makes the app an absolute must.

While *iTunes'* music library is less comprehensive than that of *Rhapsody* or *Napster*, its ease of use makes it a Softy winner. A cursory glance at the screenshot demonstrates our point. Simple playback controls sit prominently at the top of the screen. The colors aren't garish, and the alternate shading of song titles makes long lists easy to read. The search bar is handily situated at the top of the screen—just where we want it to be. Once you start digging beneath the brushed aluminum finish, you'll find even more luscious features. Smart Playlists dynamically generate playlists from your collection based on a few simple rules. Want a list of those lost tracks that you listen to the least? No problem. Want to hear a random sampling of all the songs you've added since that MP3-snatching party? You got it.

That's just the beginning, folks. Check out *iTunes* for yourself. It's capable. It's sexy. It doesn't spy on you. It doesn't nag you for upgrades. It's fantastic. It's free.

www.itunes.com

Heresy? We think not. Apple's *iTunes* is the kind of jukebox the whole family will want to gather around.

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2 Trillian Pro 2.0

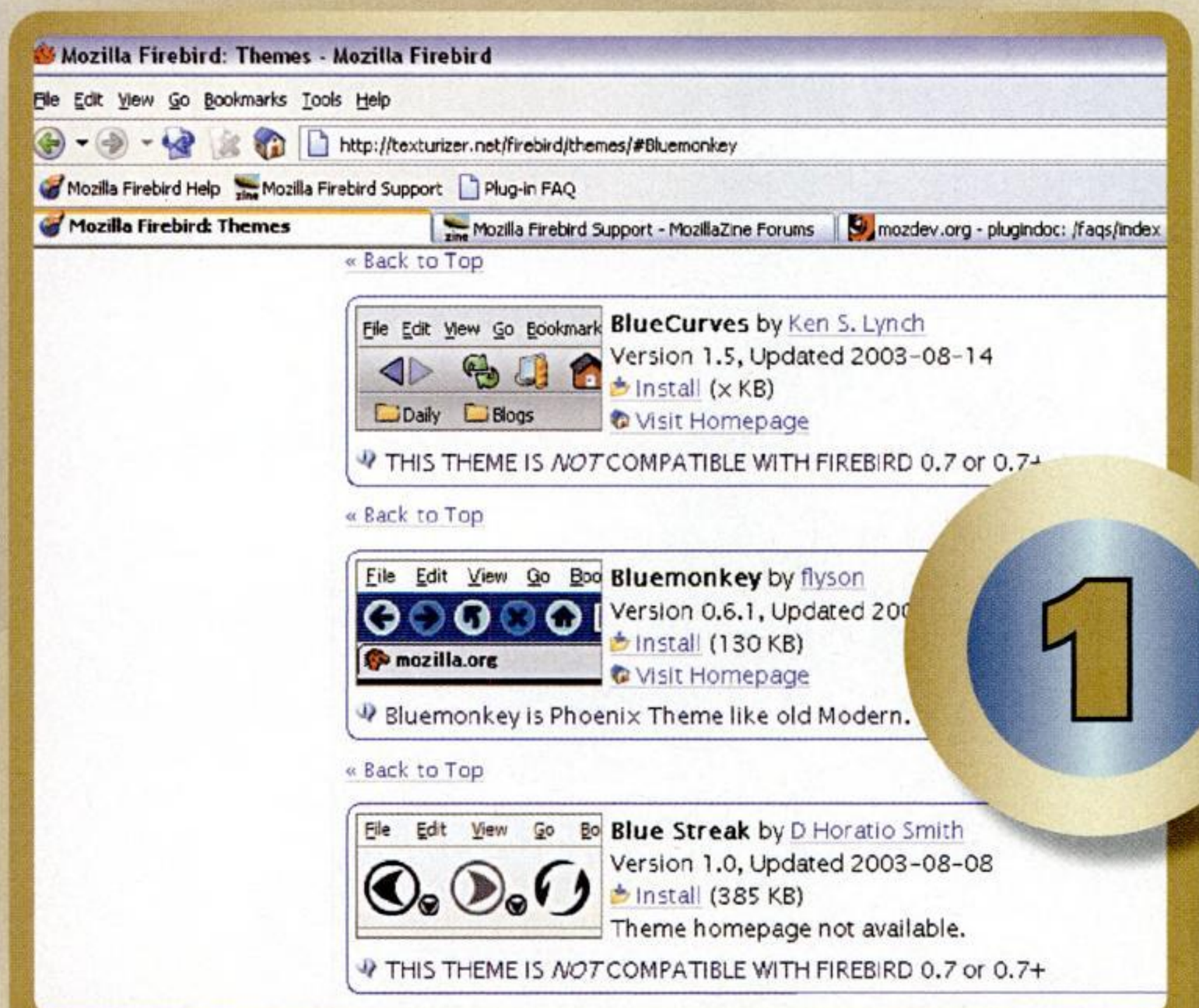
If your system tray is lit up with more instant messaging clients than Las Vegas during Porndex, you need *Trillian Pro 2.0*. It supports AIM, ICQ, MSN, Yahoo, IRC, and the new open-source Jabber standard in a single integrated client.

In addition to its omni-functionality, *Trillian Pro* is highly customizable. You can easily add plug-ins and skins, and you can set transparencies so that inactive windows disappear—a very handy tool if you need to convince your boss that you're "working." And unlike all the other bloated IM clients, which have become more complicated to operate than a stealth bomber, *Trillian* pares instant messaging down to the bare-bones. Just type a message, send it, and you're done.

As we like to say here in the Ma*ximum PC* offices, *Trillian* is f'ing awesome. Don't miss out on the best IM client in town.

www.ceruleanstudios.com

***Trillian Pro 2.0* is the only IM app that merges ICQ, AIM, Yahoo, MSN, and IRC into one skinnable client.**


Mozilla Firebird: Themes - Mozilla Firebird
File Edit View Go Bookmarks Tools Help
http://texturizer.net/firebird/themes/#Bluemonkey
Mozilla Firebird Help
Mozilla Firebird Support
Plug-in FAQ
Mozilla Firebird: Themes
Mozilla Firebird Support - MozillaZine Forums
mozdev.org - plugindoc: /faqs/index
« Back to Top
BlueCurves by Ken S. Lynch
Version 1.5, Updated 2003-08-14
Install (x KB)
Visit Homepage
THIS THEME IS NOT COMPATIBLE WITH FIREBIRD 0.7 or 0.7+
« Back to Top
Bluemonkey by flyson
Version 0.6.1, Updated 200
Install (130 KB)
Visit Homepage
Bluemonkey is Phoenix Theme like old Modern.
« Back to Top
Blue Streak by D Horatio Smith
Version 1.0, Updated 2003-08-08
Install (385 KB)
Theme homepage not available.
THIS THEME IS NOT COMPATIBLE WITH FIREBIRD 0.7 or 0.7+

1 Mozilla Firebird

The crème of this year's software crème made its debut in the November issue of *Maximum PC*, where it soundly defeated *Internet Explorer's* de facto web browsing standard in a tense, action-packed Head 2 Head.

Firebird is nothing short of a revelatory experience. User-friendly efficiencies like tabbed browsing, which allows you to open multiple web pages within the same window, are a gratifying departure from *IE's* clunky, multi-window approach. You can even save entire sets of tabs as bookmarks, so that all your favorite web sites automatically load whenever you launch the browser. The integrated pop-up blocker effectively eliminates the web's most annoying attribute. Is it any wonder we're hooked? Sure, you can download pop-up blockers and customizations for *Internet Explorer*, but shouldn't these features be included by default?

We fell in love with *Firebird's* open-ended nature and the access it gives us to an ever-expanding slew of interesting extensions (like the Optimoz *Mouse Gesture* extension, for example, which lets us manipulate the browser with graceful, swooping mouse movements.) And did we mention that it's free? The best part, however, is that *Firebird* hasn't even hit version 1.0 yet. Actually, that's the next-to-best part. The best part is that *Firebird* is Mozilla's direct challenge to Microsoft on the web browser front. No matter who wins, the battle will give us all a better browsing experience.

www.mozilla.com ■

***Firebird* can open all your favorite web sites simultaneously when you launch your browser.**

Diplomacy can be a heated exchange.
~ Especially at 518° ~

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*PC GAMER AUGUST/2001

TEEN T CONTENT RATED BY ESRB — Violence

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the MAXIMUM PC CHALLENGE

This month: USB KEY TORTURE TESTS

Freezing, heating, crushing, drowning, free falls, and harsh language—how much can flash memory endure?

Some things—penicillin, atomic bombs, Lucy Liu—forever alter the contours of our world once they are introduced, and it's tough to conceive of what life would be like without them. So it is with flash-memory-on-a-USB-connected-stick, which we fondly call USB keys. Ever since we got our first 16MB key fob, we turned away from our floppy drives and never looked back. Now that USB keys are available in capacities up to 2GB—that's gigabytes, folks—these pups have evolved into our personal little black boxes, containing a record of our lives; our e-mail, work files, PC settings, and even entire movies are made available in the presence of any USB port.

The problem is this: Accidents happen. How many times have you dropped your car keys? Sat on your sunglasses? Washed your wallet and all its contents? All these things can happen to your USB key, too. One drunken, fully-dressed editor who will go unnamed even fell off a boat with his precious USB key in his pocket. The data was fine, but it made us wonder: Exactly how much abuse can these things take?

That's what we set out to determine. We invited three manufacturers to let us put their USB keys through five ugly scenarios that replicate the mishaps of daily life. We put files on each USB key and attempted to retrieve them after each test (using a fresh USB key each time). Read on for the results, so when the unexpected should happen, you won't have to wonder if panic and hysteria are warranted.

—LOGAN DECKER

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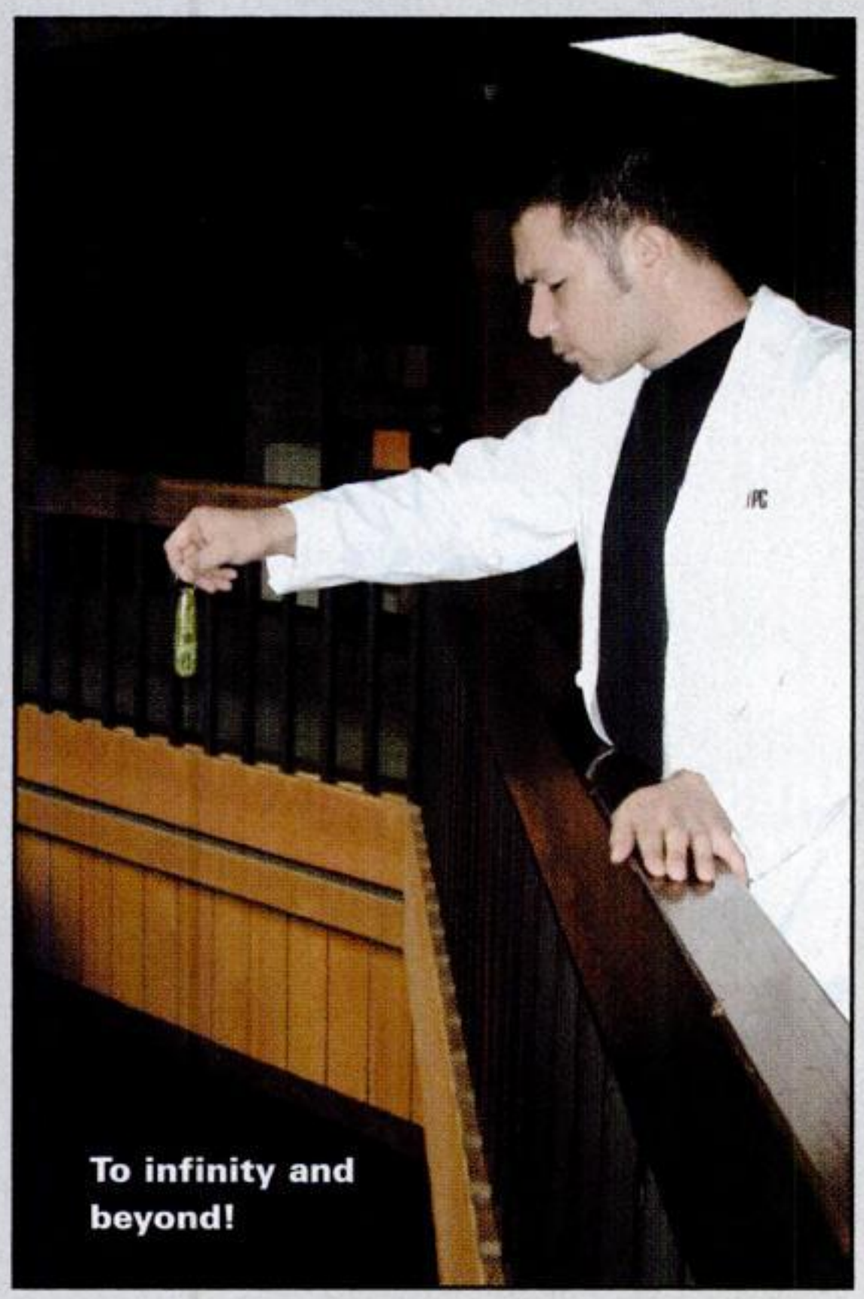
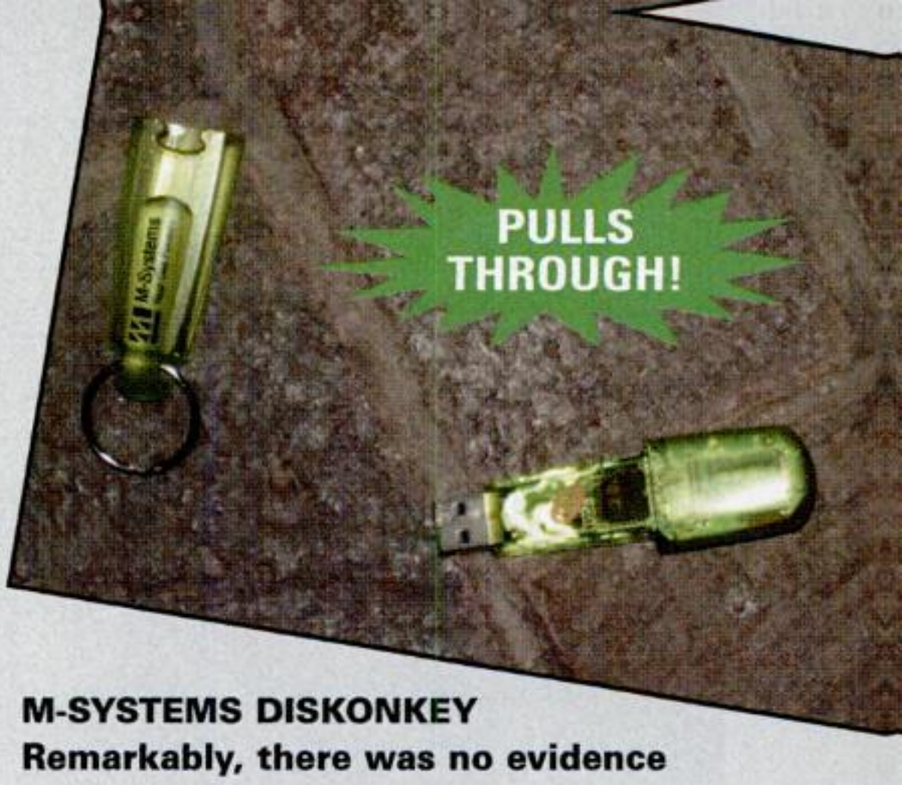
FREE FALL

It's an inescapable fact that, when you fall, life doesn't always hand you a bungie cord. This was certainly true for three USB keys that were dropped from the ledge of the Maximum PC courtyard as horrified deli employees watched from behind their counter. That's a 20-foot drop onto cold, hard brick. We know USB keys are rugged enough for common drops, but what about high-impact collisions? Have a look.



To infinity and beyond!

CRUCIAL GIZMO
The Gizmo walked away looking like crap—its faceplate broke off, exposing a sticky surface underneath—but didn't lose a single byte of data.

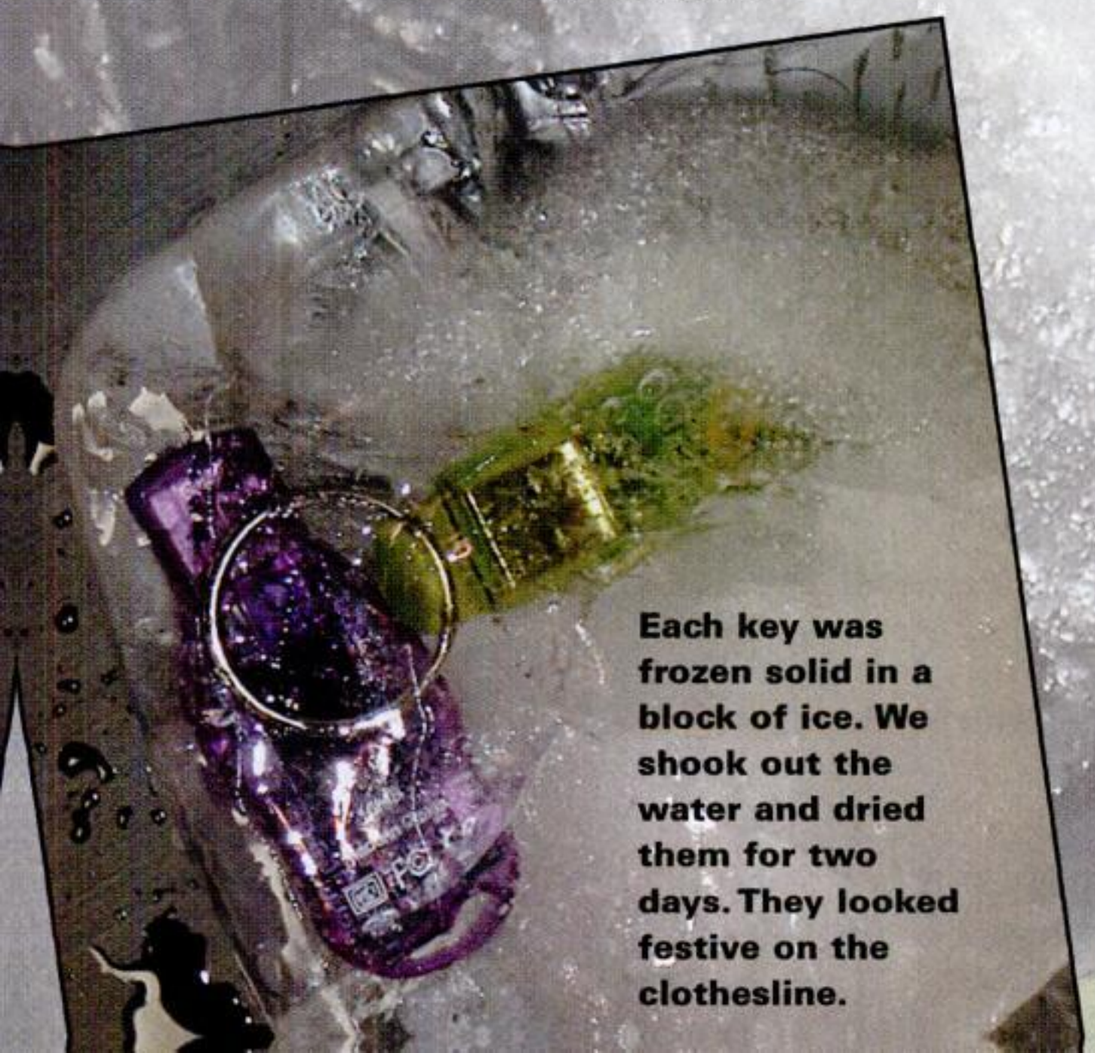


M-SYSTEMS DISKONKEY
Remarkably, there was no evidence that the DiskOnKey had been traumatized at all. Not a single scratch on the outside nor any loss of data on the inside.

LEXAR JUMPDRIVE
Sensitive folks should look away. The JumpDrive shattered on impact, with bits of the case and PCB going in different directions. All data was lost.

DEEP FREEZE

Innocent Californians live their lives never fearing snow or ice... until their rented SUVs have to be dug out of a frozen embankment by rescue teams in the Sierras. This is the kind of tragedy that makes us wonder how capable USB keys are of withstanding the condensation that results when going from extreme cold to room temperature. Our test: Three USB keys are dropped into a container of water and then placed in the freezer until frozen solid. Medic!



Each key was frozen solid in a block of ice. We shook out the water and dried them for two days. They looked festive on the clothesline.

CRUCIAL GIZMO
We were amazed. Although frozen solid in a block of ice and thawed for two days, every key retained its data, including the shiny Gizmo!

M-SYSTEMS DISKONKEY
The DiskOnKey took up the most water of the bunch, and required about three minutes to shake out. But the data lived on.

LEXAR JUMPDRIVE
The reigning "aquatic champ" of USB keys proved as impervious to cold as it was to suds.

SPIN CYCLE

It's the classic domestic error—leaving something in a pocket that's headed for the wash. Garment manufacturers are required by law to include laundering instructions with all their products: However, USB keys are not considered garments, and are thus exempt from this law. So we took it upon ourselves to see if a USB key could handle the rigors of a front-loading washing machine (permanent press, hot water, cold rinse, Tide detergent).

M-SYSTEMS DISKONKEY
DOK was DOA. The flash memory chip actually detached from the PCB, making for an interesting rattler but an unusable storage device.

LEXAR JUMPDRIVE
Imagine that. A barrel full of thick suds. Hot water. Two rinse cycles. A furious spin. And Lexar's JumpDrive *still works*!

CRUCIAL GIZMO
Crucial's dainty key came out of the wash looking and smelling fantastic—but after two days of drying, our test system failed to recognize it

It was during the second wash cycle that the idea hit us—a washable PC!

TUMBLE DRY

If you've ever pulled a matchbook out of the dryer, you know it's not a pretty sight. All the heads are gone, and the matches are curled up like dead insect legs. But how about your USB key? Can it withstand the throttling of a tumble dry in a lab coat pocket under hellish temperatures? We tested the keys—high heat, at 10 and 30 minutes.

CRUCIAL GIZMO
10 minutes: The key lives. 30 minutes: The Gizmo smells a little rank, and the key no longer works.

M-SYSTEMS DISKONKEY
10 minutes: The key lives. 30 minutes: Although no damage is physically apparent, the key isn't recognized by our test PC

Many were the suspicious looks we got from the laundromat matron during this test. We tried to act natural.

LEXAR JUMPDRIVE
10 minutes: The key lives. 30 minutes: Again, no physical damage, but the key is dead. The message is clear.

HIT AND RUN

This, ladies and gentlemen, is the test we hope you never inadvertently perform on your own. Can a USB key hold up under the crushing weight of a Honda CRV?

That's one and a half tons of big-ass vehicle versus, oh, about an ounce of USB key. The outlook is not good.

The USB keys fared much better in this test than, say, an arm or a leg would have.

VICTORIOUS!

CRUCIAL
It's official. You can drive over a USB key and be reasonably assured of its safety. Not so for the person carrying it.

PREVAILS!

M-SYSTEMS
So none of the keys came out looking so good. Big deal. The important thing is that all our files were still there.

DIE-HARD!

LEXAR
Yes, even the diminutive JumpDrive, the one that shattered in the Free Fall, survived the weight of Boni's monster truck.

We're impressed. Very impressed. The keys were far more capable of handling life's little calamities than we ever imagined. But they're obviously not indestructible. Remember, these tests are only general indicators of the durability of USB keys and flash memory. And our survey sample is just that—a sample, not necessarily representative of the entire category.

Nonetheless, you can take important lessons away from this month's challenge. First, once a loosened chip detaches, it's *kaput* for your data, so if your key is damaged in any way, retrieve the data immediately and purchase a new one. You can use the old one for casual transport. Second, if your key gets wet or shows any evidence of condensation, let it dry completely before attempting to use it. Otherwise, you could fry your data, the key, and possibly your PC as well.

Third, for heaven's sake, be careful out there. ■

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Ask the Doctor

Symptom ▶ Diagnosis ▶ Cure

CLOCK SPEED INCONSISTENCY

I just got an ATI Radeon 9600 Pro 128MB videocard, and it's clocked at a 398MHz core and 297MHz memory. It was advertised as 400MHz/600MHz. I also saw that the same card in your Lean Machine was clocked at 400MHz/600MHz. What happened to mine? I'm overclocking it using *Rage 3D Tweaker 3.9*, but I'm nowhere near the 600MHz memory clock speed.

—AL ROMERO

The number your vendor advertised is the *effective* clock speed, which you can calculate yourself by multiplying the actual clock speed by two. This effective clock speed is how fast single data rate (SDR) memory would have to run to transfer the same amount of data as the double data rate (DDR) memory on your board.

We think that reporting effective clock speeds is bunk, and as a general rule, we don't report them. Unfortunately, we goofed in the Lean Machine article, and reported the effective speed.

Your videocard's memory has an effective clock of about 600MHz effective. Actually it's 594MHz, but most videocards can't change core and memory speeds by a single MHz. Instead, the clocks are set as near to the promised number as possible, then the number is rounded off to the nearest whole number. The small clock speed discrepancies aren't worth getting upset about, though. A 2MHz core clock adjustment on a 9600 Pro will net you less than 1fps in most benchmarks.

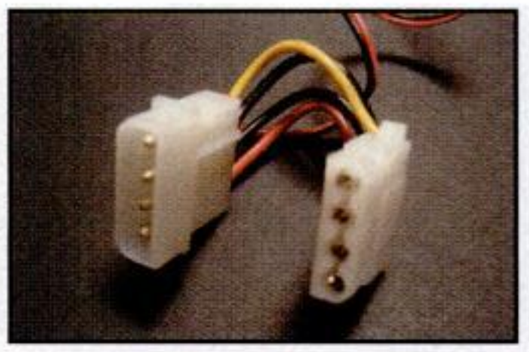
SERIAL ATA POWER POSER

I'm running two Western Digital Raptor Serial ATA hard drives in a RAID 0 stripe. Is there any performance difference between using an adapter to utilize the Serial power connection and using the standard four-pin Molex.

—SETH DEWBERRY

Using your Raptor's four-pin Molex connector won't hurt your RAID array's performance at all, but if you use the Molex connector instead of the Serial ATA power connector, you won't be able to unplug your drives while the machine is running. Of course, because you're running a RAID 0 striped array, you wouldn't be able to do that anyway.

Serial ATA power connector.



Four-pin Molex power connector.

MY BROWSER'S GONE BONKERS

I made the mistake of visiting Miramax.com to get some info about a DVD. Next thing I knew the browser—*Internet Explorer 6*— had opened up full screen. I resized it and clicked on a link, only to find it had once again gone full size. Now whenever I open a new browser it goes full screen.

This is extremely annoying. I've cleared my Internet temp files and web site history caches, but *IE* still opens full screen. I had things just the way I wanted them, and then a rude and presumptuous web designer decided his or her site was more important than anything else I had to look at and constantly rubs my nose in my mistake.

I've had this happen before with other sites, and I usually make a point of never visiting them again. Eventually *IE* resumes opening at the desired size, but how can I force it to do so more quickly? I'm sure I'm not the only person who's had to deal with this inconvenience.

—JOHN C. LIND

The answer is easy if you know *Internet Explorer's* little secret. You see, *IE* saves the window settings for the last window that closes, so all you have to do is close all your windows (including those in Windows Explorer) except for a single *IE* window. Then size that *IE* window the way you like it, and close it. The next time you restart *IE*, your window settings should be back to normal. If that doesn't work, just download *Mozilla Firebird* from www.mozilla.org. You won't be disappointed.

> *"I WENT FOR BROKE AND CRANKED THE BUS TO 200MHZ. THAT WAS WHEN EVERYTHING WENT WRONG."*

POP-UPS COMING FROM NOWHERE

I am fraught with a small but highly annoying problem: pop-up windows. I know, everyone tells me to get a pop-up stopper, and I even installed one on my mother's PC, but these windows just come from out of nowhere. I don't go to many sites with pop-up windows, and the ones I do go to don't annoy me that much. However, when I'm in the middle of a *MS Word* document trying to finish an essay, and I'm still getting pop-ups when the browser is closed, it pisses me off!

I'm sick of being pestered for "4,000 free smiley faces" and free cigarettes. I downloaded and ran *Spybot Search & Destroy* from last month's Maximum CD and got rid of a lot of spyware, but it didn't fix my problem. I had *Kazaa* on my computer, but deleted it when I was trying to fix the issue. I know *Kazaa* is known for spyware and pop-up crap. Unfortunately, getting rid of *Kazaa* didn't do the trick.

—MATT GIANNOTTI

In order for most pop-ups to appear, you need to be running an application. Because you're getting pop-ups even when no other apps are open, we can narrow the culprit down to one of two things. It's either pop-up-spawning spyware, which can most likely be ruled out since you've run *Spybot*, or it's Windows Messenger spam.

Messenger spammers take advantage of an old system administrator tool that allows you to send console messages to other Windows users on your network. Because many users connect their PCs directly to the Internet, spammers can send those messages to thousands of IP addresses at a time, creating even more Internet cruft for hapless end users to mow through.

The good news is that Windows Messenger spam—not to be confused with the instant messaging client—is easy to get rid of. To totally stop it, go to Control Panel, Administrative Tools, Services and double-click the Messenger Service. Change the startup type from Automatic to Disabled, and then press the Stop button. This will kill the Messenger and should stop your pop-up woes.

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JUST PASSING THROUGH

I followed the instructions you gave in the Broadband Sharing story in the September issue, but I'm having trouble getting my second PC online. I wanted to connect my second PC to my first PC using the latter's dual LAN—it has the nForce onboard LAN and 3Com networking built in. Unfortunately, when I connect the second PC to the nVidia LAN on the motherboard via CAT-5, I get no connection between the two machines. The first PC, which I'm using as the gateway can see the Internet, but it can't see the second PC. The lights on the network card for the second PC don't even show up. I even tried using another network card to no avail. What am I doing wrong?

—DAVE BOND

Well, Dave, because you chose not to use a hub to connect the two PCs, you'll need what's called a crossover cable. For Ethernet networks, there are two pairs of wires in the CAT-5 cable that matter: One pair handles data transmission, the other handles data reception. Hubs connect the transmission pair from one PC to the reception pair on the other PC, which lets the computers talk to each other. When you connect two normal network cards with a normal Ethernet cable, the computers' transmit pairs are connected to each other, rather than to the reception pairs of their respective mates. For just a couple bucks, you can buy a crossover cable, which will connect transmit to receive and receive to transmit, at CompUSA or most other computer shops.

OVERCLOCKING GONE BAD

I just bought an Asus A7N8X motherboard along with an Asus GeForce FX 5200 and an AMD Athlon XP 2200+. Originally, the bus was set to 100MHz with a multiplier of 13.5. Being power hungry, I decided to up the bus to 133MHz. Everything worked great! So I went for broke and cranked the bus to 200MHz. That was when everything went wrong.

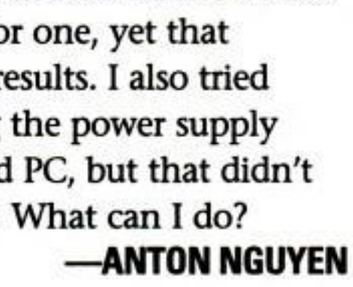
Now when I try to turn on the computer, the videocard gives me no output, and all I hear is a beep coming from my PC every few seconds. I've tried removing all the sticks of 256MB DDR PC3200 RAM save for one, yet that yielded no results. I also tried substituting the power supply from my old PC, but that didn't work either. What can I do?

—ANTON NGUYEN

The bad news is that you may have fried your motherboard. We've heard reports of nForce2 motherboards being killed by overclocking. Hopefully you have a newer revision of the board with the latest BIOS, which would negate that risk.

Before giving up hope, try to boot the board while holding down the Insert key. On many boards, this will reset the BIOS after a bad overclock attempt. You can also try to reset the BIOS by throwing a jumper on the motherboard. If you can't find the jumper, just unplug the power supply, pull the CMOS battery, and wait five minutes. If that fails, detach the CPU fan and remove the CPU. Wait five minutes and replace it, then restart your computer.

If all of the above fails, you're probably going to need a new mobo. Remember, successful overclocking is all about baby steps. Jumping from 133MHz system bus to 200MHz system bus is too much too soon.



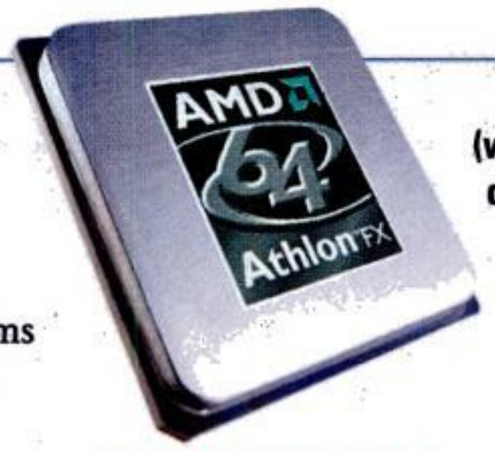
Is your computer twitchier than normal? It isn't bad videocard drivers, it's dangerous solar flares! This month, we'll show you how to protect your PC from deadly solar flares, and the Doctor will also provide a loving spoonful of PC problem solving. Got your own computer conundrum? E-mail the Doc at **doctor@maximumpc.com**, just don't expect a personal reply. The Doctor gets oodles of e-mail every week and simply can't respond to them all.

ATHLON 64 INFO, PLEASE

I thought I knew all about the new AMD 64-bit chip that's coming out, but I'm confused. After some more research, it seems the chip is available in three forms. The Athlon 64 3200+ runs at 2.0GHz, sits in a Socket 754, rides a 1600MHz bus, and costs about $400. The Athlon 64 FX-51 runs at 2.2GHz, sits in a Socket 940, and costs about $750. The Opteron 146 runs at 2.0GHz, sits in a Socket 940, and costs about $700.

I was considering my next system build, but now I'm confused about the types of processors. I like the nForce3 board with the 940-pin socket but I'm wondering why the 754-pin socket processor is about half the price. All the articles I've read say the processors have the same basic features, so what's the difference between these chips?

—RON JULIO



The Athlon 64 FX is undoubtedly fast, but the configuration options are extremely confusing.

Actually, the chips don't have exactly the same basic features. The big difference with the Athlon 64 3200+ is that it supports just a single-channel memory controller, and can accommodate nonregistered RAM. The Opteron and the Athlon 64 FX (which are kissing cousins) support dual-channel memory controllers and use only registered RAM. (Registered RAM runs slower but is generally preferred for servers and workstations).

The difference between the Socket 940 Opteron 146 and the Socket 940 Athlon 64 FX-51 is the number of HyperTransport links. The Opteron has three HyperTransport links to support I/O options, while the FX has just one. The main difference between the Opteron 246 and 146 is cache coherency. AMD did not enable cache coherence in the Opteron 146 CPU which is designed for single-processor workstation use. Plug two Opteron 146 CPUs into a dual board and it just won't work. Next year, AMD will introduce a new Socket 939 version of the Athlon FX which will have dual-channel RAM support but will work with cheaper and faster nonregistered RAM.

The price difference between the motherboards is likely related to their number of layers. We suspect that the Socket 939 design will work with cheaper, four-layer motherboards. Similarly, Socket 754 boards are likely cheaper because they have fewer layers as well.

I'VE GOT THE SONY VAIO UPGRADING BLUES

I have inherited a discontinued Sony Vaio mini-tower, model number PCV-RX651, but it's missing a processor. The base processor for this version is a Pentium 4 1.7GHz. I would like to purchase the fastest processor available for this machine, but I can't figure out what the fastest compatible processor is!

The motherboard is an Asus P4B266-LM. I have checked with Asus, but they don't have this model listed in the archives, so they can't help me. I've talked to Sony technical support, but they couldn't help me either. I've been able to figure out a little bit by looking at the chipset. The southbridge chipset is labeled FW82801BA, it has a PGA478B socket, and uses a 400FSB with two DDR slots.

—ANDREW ARSHON

The Doctor believes your board is simply a contract board for Sony that's based on the P4B266 motherboard. It uses the 845 DDR chipset. Now, the sticky question is whether the BIOS supports Northwood-core CPUs. If the machine is very, very old, the BIOS may not let you run Northwood-core CPUs. One way to find out is to see if the computer has a configuration sticker on it that indicates how much L2 cache the CPU has. If it has just 256KB of L2, it may not work with a Northwood Pentium 4 without a BIOS update. Your best option is probably a 2GHz Willamette Pentium 4.

If the cache has 512KB of L2, then it supports Northwood CPUs. If you lucked out and have Northwood support, you should be able to buy a 2.6GHz CPU. Keep in mind that you need to stick with Pentium 4 CPUs with 400MHz bus speeds. The fastest was the 2.6GHz P4A, but those are in short supply. There are plenty of 2.4GHz P4As available, though. ■

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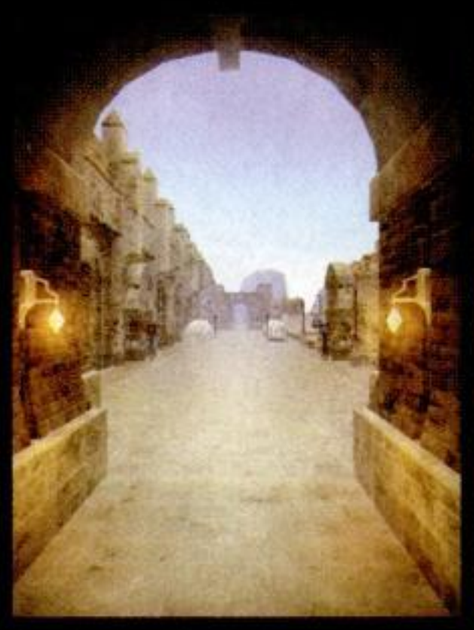

Trion : It is your head that is swollen, brother. With enough numbers, we could crush the beastmen! And without having to resort to your misguided tactics!
Pieuje : My tactics, misguided? Oh, that is rich! Tell me of the tactics that lost an entire company in Batalia Downs the other day?
Trion : It's good you're so fond of talking, as I've never seen you wield a sword! Better to shout orders from the rear than reveal your ineptitude in actual combat!
Claidie : Stop your quarreling, both of you!!

The Star Sibyl summoned me to Heavens Tower and handed the Book of the Gods over to me.
Tosuka-Porika : I was ordered to never let that come see the light of day again.
Tosuka-Porika . . . Hmmm...
That's what the Star Sibyl ordered, so I must obey!
But I...that is something I just cannot do!
Tosuka-Porika : The verses of the Book of the Gods are bleak! I cannot turn my eyes from the truth. As the name of the Ortisterx suggests, we are the eyes of Windurst!
Tosuka-Porika : If I ignore the truth before me, how can I call myself the Minister of the Ortisterx?

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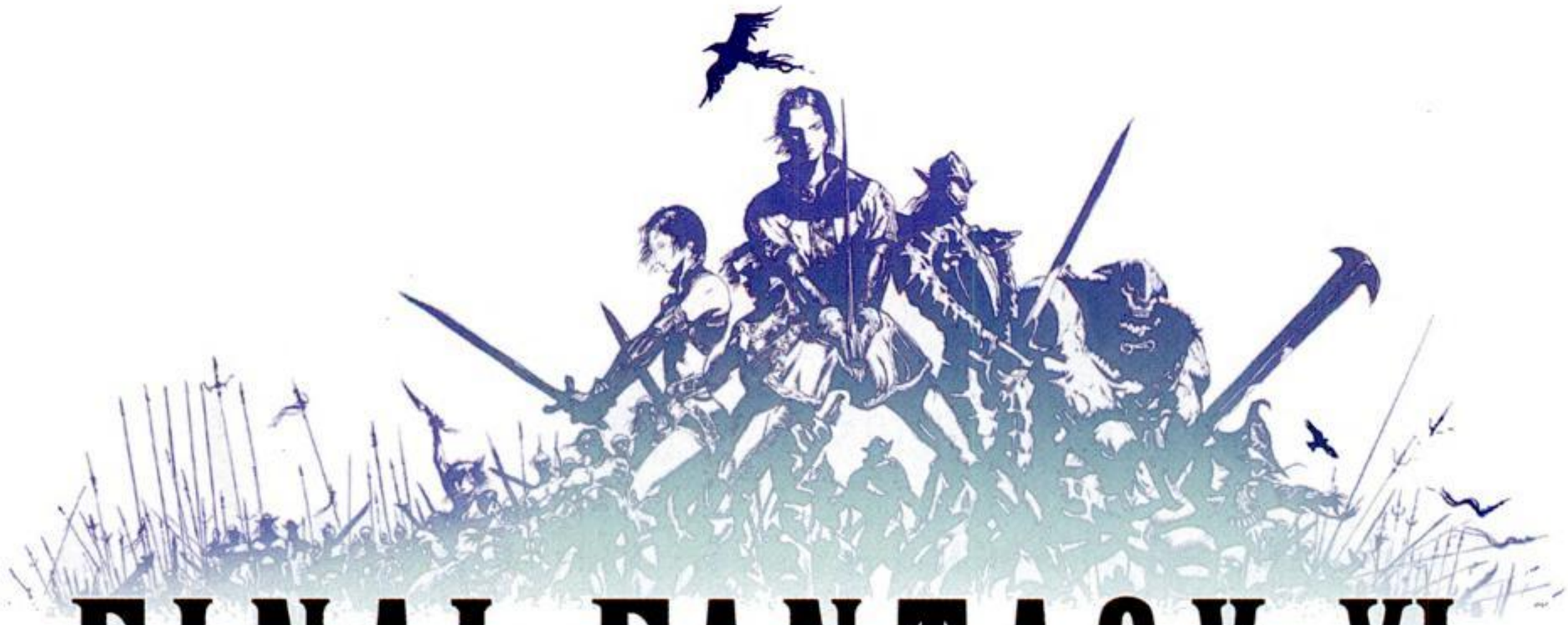

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How To... A step-by-step guide to tweaking your PC Experience

SCULPT YOUR SYSTEM'S AIRFLOW SCHEME

With our handy guide, there's no need to resort to extreme measures

MAXIMUM PC
TIME TO COMPLETION
00:45
HOURS MINUTES

BY WILL SMITH

You've built your own dream machine, tweaking and overclocking it to perfection, but have you paid enough attention to its cooling scheme? With today's high-end PCs sporting ever-warmer hard drives, blazing-fast CPUs, and videocards that could fry an egg, a good cooling scheme is more important now than it's ever been.

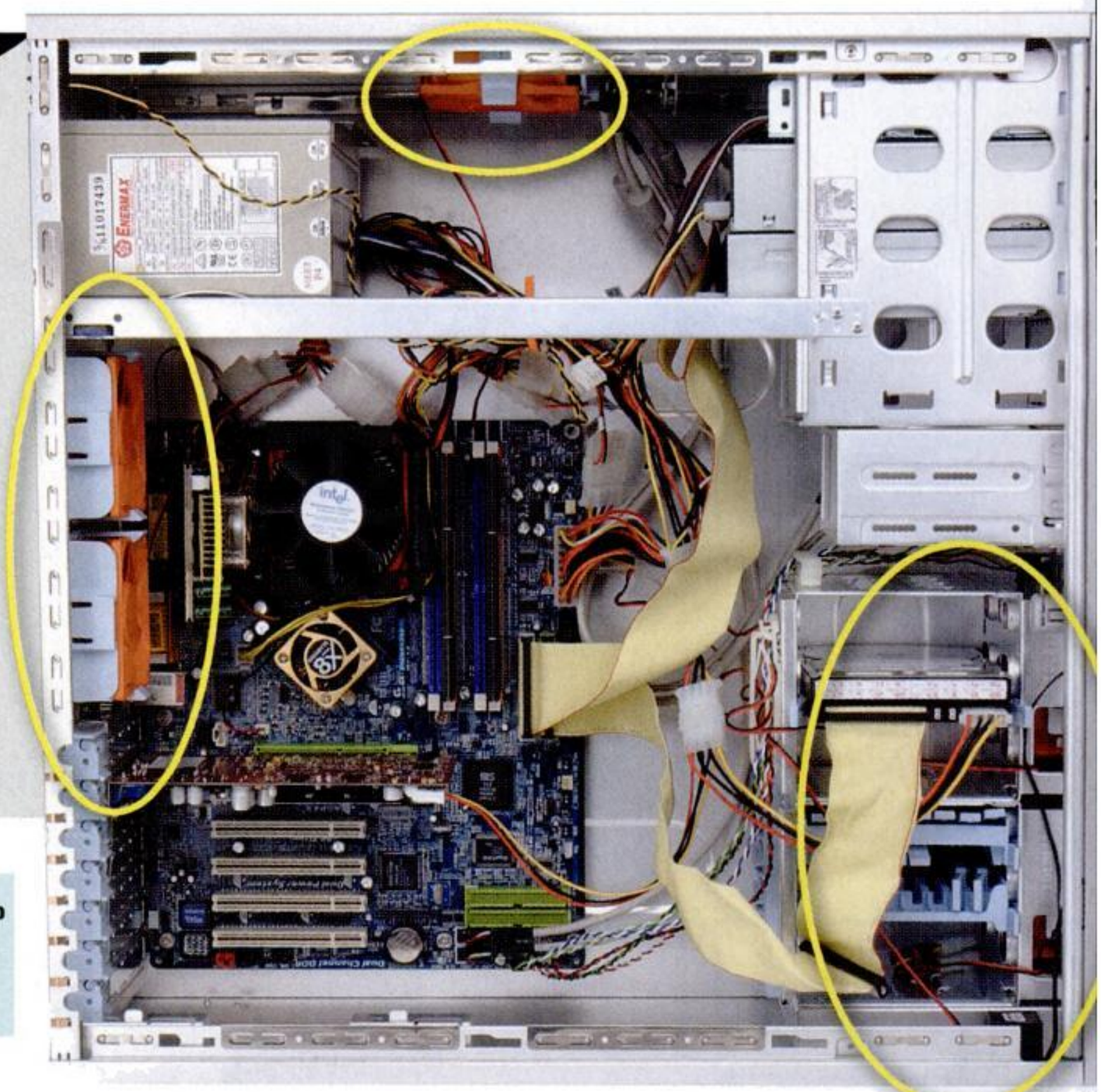
Exotic cooling techniques such as water cooling have the advantage of keeping your case temps down while remaining virtually silent. But such techniques are "exotic" for a reason: They're not for everyone. The mere thought of running water inside a PC gives most people hives. Although water cooling is perfectly safe when properly implemented, it's unnecessary for the majority of computer users and can be a hassle to maintain.

Fortunately, there's no need to resort to exotic measures to adequately cool your rig. Carefully placed, just a few fans can keep your PC plenty chilly.

First, you need to evaluate your case.

Scoping Out the Territory

Most PC cases include fan mounts in the front of the case near the bottom and in the back of the case below the power supply. You might also have a blowhole mount on the top of your case or on the door. Open your case, and nose around inside. Look for fans that are already there, as well as spots where you can mount new fans. If you don't immediately see a fan mount at the front of the case, look between the hard drive cage and the front bezel of the PC. Make sure you note the type of connector required by each fan (fans use either four-pin connectors that plug into the power supply or three-pin connectors that connect to the motherboard) and the sizes of the extra fan mounts (fan size can range from 4cm to 12cm diagonally, depending on location).



Is there a How-To story you'd like to see? Want to learn how to water-cool your rig or create your own web page? No matter how off the wall, we promise to look at your idea! Keep it to less than 200 words and send it to howto@maximumpc.com.

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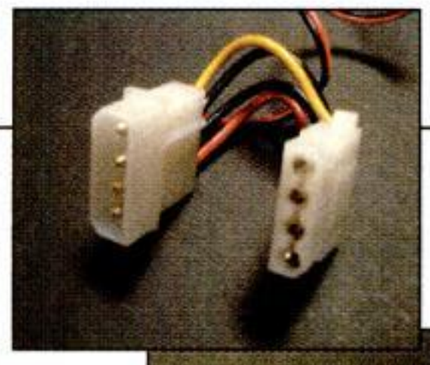
Planning Your Attack

When you're designing your system's airflow, the goal should be to suck air into your case from the front-mounted fans at the bottom and blow air out the back of the case using the fan near the power supply. For best results, you'll want as much or more air coming into the case as is going out. To tell how much air your fans are moving, check the cubic feet per minute (CFM) for each fan. The CFM rating can be found on the packaging of a new fan; you can usually find the rating for a fan already in your system by searching for the model number on Google.

When purchasing a new fan, know the difference between the four-pin Molex connector and the three-pin motherboard header connector. Three-pin connector fans draw power from your motherboard. These fans report their operating speed to the mobo's BIOS, and can even be moderated by better motherboards. Four-pin connectors draw power directly from the power supply and lack the more advanced monitoring and control features of their three-pin kin.

Three-pin fans are optimal, but they're not without problems. If you try to run a fan that draws too much power from a mobo header, you can overload that header and render it nonoperational. Most motherboards have two available fan headers at most, so any additional fans you may want will have to be of the four-pin variety. Most people will need to use a combination of three- and four-pin fans in their system.



A four-pin Molex connector

A three-pin mobo header

Pay attention to the arrows on your fan.

Sucking In Cool Air

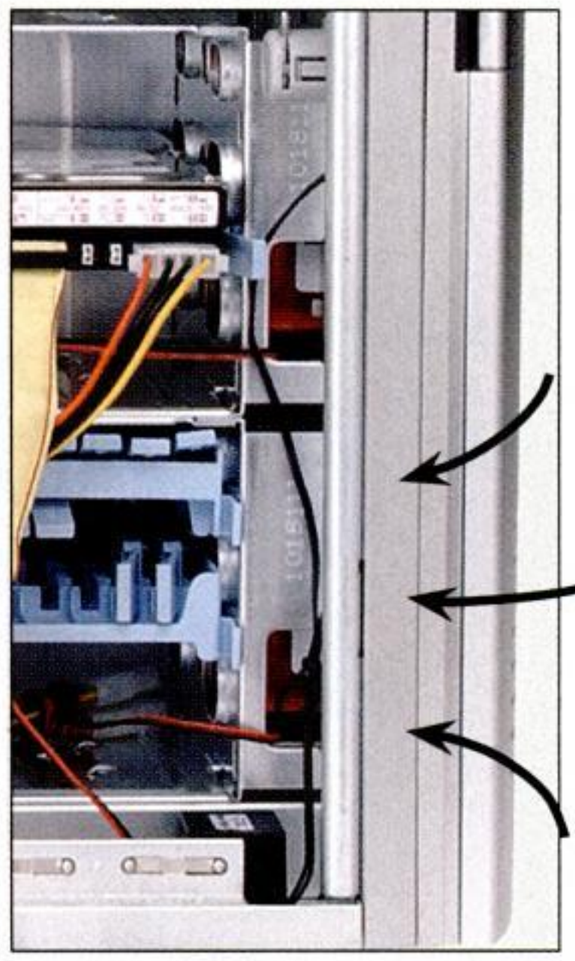
Having a fan or two sucking in air from the front of your case performs two functions. It pulls cool air into your case to get air circulating throughout, and it runs cool air over your hot hard drives in particular. How much air do you need coming into your case? If you have just a single 7,200rpm hard drive, you're probably safe with a single fan in the 25-30CFM range. If you're running more than one drive, or running a drive that's 10,000rpm or faster, you'd be wise to increase the airflow.

There are two ways to suck more air into your case. You can either use a fan that moves more air, or, if your case will accommodate them, you can use a couple lesser-capacity fans instead. Dig: One fan that moves 50CFM of air makes about 50dB of noise, while a single fan that moves about 28CFM makes just 22.1dB of noise. In other words, it's possible for two fans to move more air and yet be significantly quieter than one more potent fan.

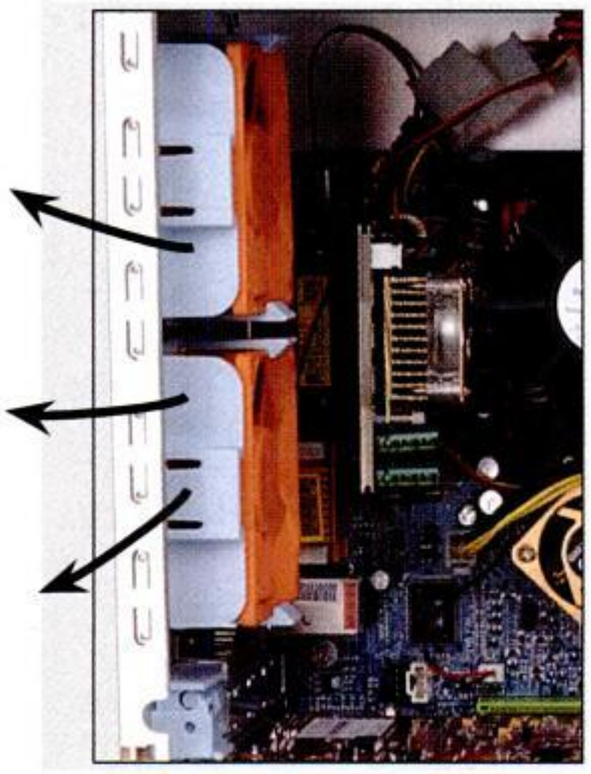
If your mobo has a fan header close to the front of the case, this is a good place to use a three-pin fan. If you set your BIOS to slow down the mobo-controlled fans when they're not needed, your system will run much quieter when idle. You might be tempted to go with fancy thermistor fans for the front of your PC, but we don't recommend them in this location. Thermistor fans adjust their speed based on the temperature of their surroundings. Unfortunately, it never gets hot enough in the front of the case for thermistor fans to crank up to speed, which could adversely affect cooling in the rest of your system.

Before mounting your fans, make sure the air will flow in the proper direction. On one side of the fan, you'll see a pair of small arrows stamped into the plastic. These arrows show both the direction the fan rotates, and the direction air will flow through the fan.

If you have lots of air moving into your case, you can move on to the next step.



Blowing Out Hot Air



You already know that you want to blow hot air out the back of the case; in fact, your power supply fan should already be blowing air out. We're just going to give it a little help.

The best location for a powerful fan is directly beneath the power supply. That fan will suck hot air away from the CPU and memory, and will really make a difference in keeping your system cool. This is an ideal spot to use a thermistor-controlled fan because this area will always be relatively warm, and can even get downright hot.

If your system already has a fan beneath the power supply, consider using the blowhole on top of the case—usually between the optical drives and the power supply—to crank up your cooling a notch. The blowhole helps get air moving in an area that's typically neglected.

Fans mounted on your case door can make a difference with AGP cards. If you go this route, experiment with both fan settings—air sucking in and blowing out—to determine which cools your AGP cards the most. Because the fan mount's placement on the side of the case can vary, there's no hard and fast rule here.

Winding Down

It's easy to go completely overboard with cooling. There are loads of fan buses, slot coolers, heat pipes, and other high-end cooling products that sound attractive but are completely unnecessary for non-overclocked machines. A typical user should be well taken care of with an airflow-oriented cooling scheme that's quiet enough to run all the time, and powerful enough to cool a hot PC. ■

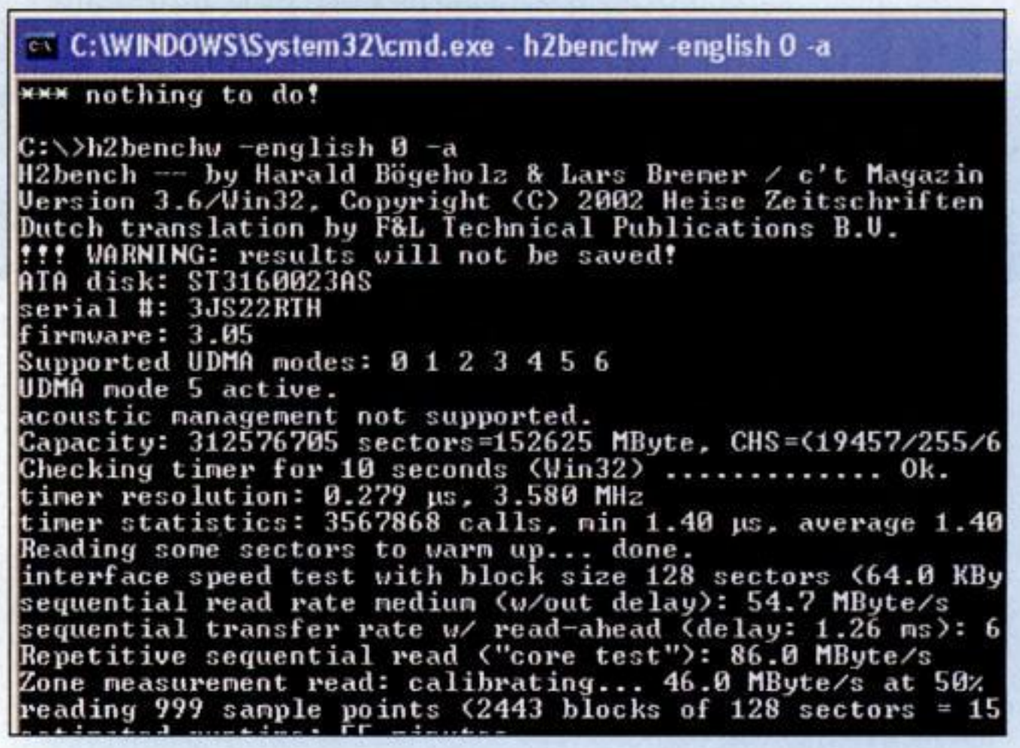
Reprinted material

In the Lab

A behind-the-scenes look at Maximum PC testing

Inside the Benchmarks

Hard drive benchmarks get an overhaul


C:\WINDOWS\System32\cmd.exe - h2benchw -english 0 -a
*** nothing to do!
C:\>h2benchw -english 0 -a
H2bench -- by Harald Bögeholz & Lars Brener / c't Magazin
Version 3.6/Win32, Copyright (C) 2002 Heise Zeitschriften
Dutch translation by F&L Technical Publications B.V.
!!! WARNING: results will not be saved!
ATA disk: ST3160023AS
serial #: 3JS22RTH
firmware: 3.05
Supported UDMA modes: 0 1 2 3 4 5 6
UDMA mode 5 active.
acoustic management not supported.
Capacity: 312576705 sectors=152625 MByte, CHS=(19457/255/6
Checking timer for 10 seconds (Win32) ..... Ok.
timer resolution: 0.279 µs, 3.580 MHz
timer statistics: 3567868 calls, min 1.40 µs, average 1.40
Reading some sectors to warm up... done.
interface speed test with block size 128 sectors (64.0 KBy
sequential read rate medium (w/out delay): 54.7 MByte/s
sequential transfer rate w/ read-ahead (delay: 1.26 ms): 6
Repetitive sequential read ("core test"): 86.0 MByte/s
Zone measurement read: calibrating... 46.0 MByte/s at 50%
reading 999 sample points (2443 blocks of 128 sectors = 15

This month we welcome *H2Benchw* to our hard drive testing regimen. It runs drives through a barrage of tests at the device-driver level and executes both "real world" and synthetic measurements.

Here at *Maximum PC* we're constantly grappling with hair-pulling dilemmas. For example, should we upgrade our home machine's 9800 Pros with 9800 Pro XTs? Is it worth the time? Another quagmire we find ourselves in lately is what to do with our hard drive benchmarks. Although they have remained unchanged for quite awhile and are a reasonably good yard stick for measuring hard drive performance, we still decided to give the benchmarks a second look to determine whether they were the most relevant and reliable tests we could find. It turns out they weren't.

Starting with this issue, we have embarked on a new course. Stricken from the hard drive record is Intel's *IOMeter*. Although somewhat easy to use and extremely customizable, this benchmark is designed to do only one thing—measure a hard drive's performance in a multi-user server environment. It is literally incapable of emulating a single-user desktop workload, so we gave it the heave-ho. Although *Maximum PC* is certainly the hardest-core PC magazine on the newsstands, we're still a consumer-level magazine and try to avoid venturing into enterprise territory if possible.

Replacing *IOMeter* is a wonderful command-line benchmark from our friends in Deutschland. Its name is *H2Benchw*, and it was developed by the über-computing mag *c't* (yes, it's lower case). We choose this benchmark because it replicates a "real world" environment, and that's always the best way to test a hard drive's performance (or any piece of hardware, for that matter). *H2Benchw* measures a drive's performance with both synthetic and "real world" test patterns. Synthetic performance is measured with random access tests, an interface test (burst rate), and a test of sustained transfer rate across the entire drive. Real-world performance is measured using a script of six desktop applications recorded at the device driver level. The apps all involve heavy hard drive activity and include *Photoshop*, *Word*, file-swapping, file-copying, and so forth. The benchmark runs this script on the hard drive in question and spits out a score. Once it's run all six tests it takes the geometric mean of the scores and delivers an "application index"—a numerical indication of how fast the drive is in a desktop environment. Based on our experiences thus far, the test scales well and seems accurate. Many of the synthetic tests that *H2Benchw* runs are the same as those used in *HD Tach*, and we'll continue looking at data from the latter in order to corroborate our *H2Benchw* scores.

Because we're big on scripts, we've added one more to our testing regimen. In the past we've always run BAPCo's *SYSmark 2002* and reported the Office Productivity score, but we've decided to start reporting another score that *SYSmark 2002* generates, a Content Creation score. This script runs through a battery of real-world applications including Adobe *Photoshop*, Adobe *Premiere*, *Windows Media Encoder*, Macromedia *Dreamweaver*, and *Flash*. While this script taxes an assortment of PC components other than the hard drive, such as the system bus, videocard, and CPU, we decided to throw it in because the only component we change from test to test is the hard drive.

So there you have it—our new hard drive benchmarks. All in all, we think the combination of two real world script tests and two synthetic tests provides a sound basis for evaluating a hard drive's performance. We also swapped out our test bed's Intel 850 chipset motherboard for an Intel 865PE board because of the latter's onboard and native SATA support. Since we install XP on every drive we test, it makes the installation process a lot easier when we don't have to install third-party drivers each time. Plus, the move to native SATA versus using a PCI host controller has improved scores for most drives by around 10 percent, so we're confident the switch will work out well for all parties involved.

Check back here for updates on how we test individual components such as hard drives, optical drives, videocards, and soundcards.

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Journey to the Wild Divine

Here's the angle: Instead of solving puzzles by clicking hot spots on the screen, you must find inner peace in order to complete the *Journey to the Wild Divine*.

Before you begin your journey, you place three "magic rings" upon your fingers. The magic rings are simple biofeedback monitors that track your heart rate and skin conductivity, which lets your computer measure your state of mind. As you progress through *Wild Divine*, you're presented with a series of exercises that require you to feel happy or to reach a deep level of relaxation. The events on screen sync with your body, soul, and mind to measure your progress.

Once you master the skills it teaches, you should be able to relax on command. That should help take the sting out of the $130 sticker price. **www.wilddivine.com, $130**

Test-Bed Updates

For those who missed last month's issue, we've decommissioned our faithful 2GHz P4/RDRAM test beds in favor of brand-spanking-new, smoking-fast Athlon 64 FX systems. You'll have to read our December issue for the reasons behind our hardware choices, but here are the specs: a 2.2GHz Athlon 64 FX, 1GB Corsair Micro TwinX DDR400, an Asus SK8N motherboard, an ATI Radeon 9800 XT videocard, a 250GB Western Digital parallel ATA WD2500JB hard drive, a Plextor PX-708A optical drive, an AVC Opteron 64 Cooler CPU fan, and a PC Power and Cooling Turbo Cool 510 Deluxe power supply.

Please note that not every component in this month's reviews has been tested with the new test bed; because of timing issues, some components were tested with our older reference systems. As usual, each review notes what hardware we used.

Finally, our hard drive test bed will continue to house a 2GHz Pentium 4, but we've swapped the board out for an Intel D865GBF motherboard, which offers native Serial ATA support. As more Serial ATA-equipped motherboards become available for the Athlon 64 FX, we'll look at rolling this system over as well.

Best of the Best

As of January, 2004

First up, we've chosen ATI's Radeon 9800 XT over nVidia's GeForce FX 5950 Ultra because the Radeon takes up only one slot and offers the same performance as the 5950. nVidia, meanwhile, bumps ATI from our budget card position with its GeForce FX 5700 Ultra. The ZS gets an easy upgrade over the old Audigy 2. We've also now amended our SATA picks with IBM's 250GB 7K250. The 10,000 RPM WD Raptor still has a slim edge in performance, but people also want storage options. The universe is in stasis once again, now that Plextor owns the entire optical category. And we're bumping Intel's Bonanza motherboard in favor of the Kick-Ass Chaintech 9CJS Zenith as we've been assured by Chaintech that the board will work with "upcoming Intel CPUs." Hint, hint. Canon's super fast i9100 also mows down Epson's 1280 in our photo printer category. Finally, Logitech has a clean sweep of the speaker category. Whew.

High-end videocard:
ATI Radeon 9800 XT

Budget videocard:
BFG Asylum GeForce FX 5700 Ultra

Do-everything videocard:
All-in-Wonder Radeon 9800 Pro

Soundcard:
Sound Blaster Audigy 2 ZS Platinum

Serial ATA hard drive:
Western Digital 360GD Raptor

Parallel ATA hard drive:
Western Digital WD2500JB

CD-RW drive:
Plextor PlexWriter Premium

DVD burner:
Plextor PX-708A

LCD monitor:
Sharp LL-1820

High-end CRT monitor:
Sony F520

Budget CRT monitor:
Cornerstone P1750

P4 motherboard:
Chaintech 9CJS Zenith

Athlon XP motherboard:
Asus A7N8X Deluxe Rev 2

Portable MP3 player:
iPod 30GB

Photo printer:
Canon i900

Pocket PC PDA:
HP iPaq 5450

Palm OS PDA:
Palm Tungsten C

5.1 speakers:
Logitech Z-680

4.1 speakers:
Logitech Z-560

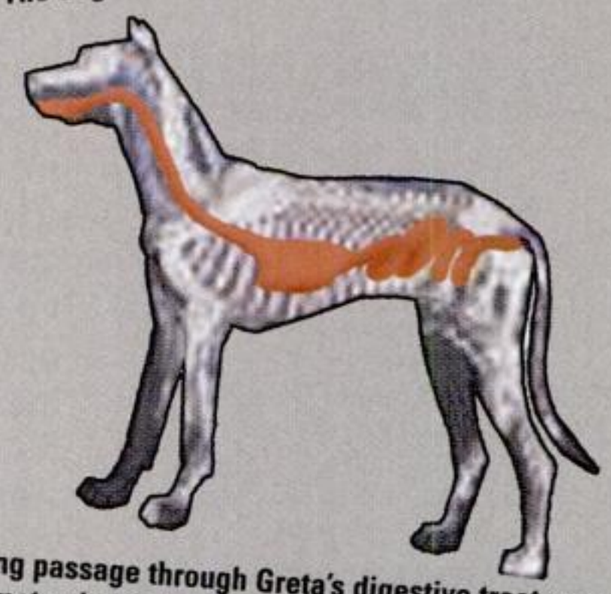
2.1 speakers:
Logitech Z-2200

What we're currently playing: *Call of Duty, Max Payne 2, Planetside Core Combat*

MaximumPC Challenge: Deleted Scenes

We originally planned for six USB key endurance tests instead of five for this month's Maximum PC Challenge. But sometimes our initial ambitions exceed our abilities to see them through.

As you may already know, our challenge attempted to duplicate common domestic mishaps that might befall a USB key. What complaint is more commonly invoked than "The dog ate it?"



Surviving passage through Greta's digestive tract presented the ultimate challenge for any device. What devastating havoc would stomach acids, high temperatures, and Gravy Train wreak?

Interesting? Absolutely. But, in the end, even our highly desensitized Lab staff refused to go spelunking for data. Don't try this at home. And if you do, please don't tell us. Or PETA.

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HyperSonic SonicBoom

This PC looks and moves like an angry bumble bee

The SonicBoom absolutely shattered several of our brand-new benchmarks.

A sonic boom is the distinctive sound caused by the shock wave that precedes an object as it surpasses the speed of sound. This is exactly what happened when HyperSonic's markedly un-mellow yellow SonicBoom blew into our Lab and instantly shattered several of the benchmarks that we created just last month.

This came as no surprise to us because the SonicBoom is outfitted with Intel's ripping new Pentium 4 Extreme Edition. Yeah, the same CPU that took top gun last month against Apple's dual-2GHz G5 and AMD's Athlon 64 FX-51. To give the P4EE a little more juice, HyperSonic overclocked it a wee bit to 3.37GHz. We instinctively frown upon OEM overclocks, given a recent spate of such boxes that either didn't live up to the hype or couldn't be mass produced. But HyperSonic swears the OC is easy to replicate for any consumer who wants it, and says it can fill all orders.

The Sonic Boom's components are mostly state of the art: 1GB of Corsair Micro PC3200 RAM, a pair of Western Digital Raptor 10K SATA drives, an ATI Radeon 9800 XT card, a Pioneer dual-format DVD drive, and a Plextor Premium CD burner. The Abit IC7-MAX3 mobo features a unique cooling system that keeps its power regulation circuits cool—an important feature for overclocking and for future CPUs that will push the power circuits to the max.

Still, we have a couple kvetches with the SonicBoom's config: It uses an Audigy 2 soundcard instead of the newer Audigy 2 ZS (reviewed on page 82), and the system needs an additional hard drive for bulk storage. It's sad but true: 73GB just doesn't cut the mustard these days.

Externally, the SonicBoom is quite fetching. Although the paint job isn't Falcon Northwest caliber, it's vibrant, professional-looking, and durable. On the inside, HyperSonic attached foam to the case's side door and sundry other empty spots in an attempt to dampen any noise the aluminum chassis might emit. Unfortunately, shipping damage to the rig's Vantec TMD fan caused it to operate at louder-than-normal levels, defeating most of HyperSonic's sound-dampening measures. (Because HyperSonic has been unhappy with the Vantec fan's performance, the company is dropping it in favor of a different make.)

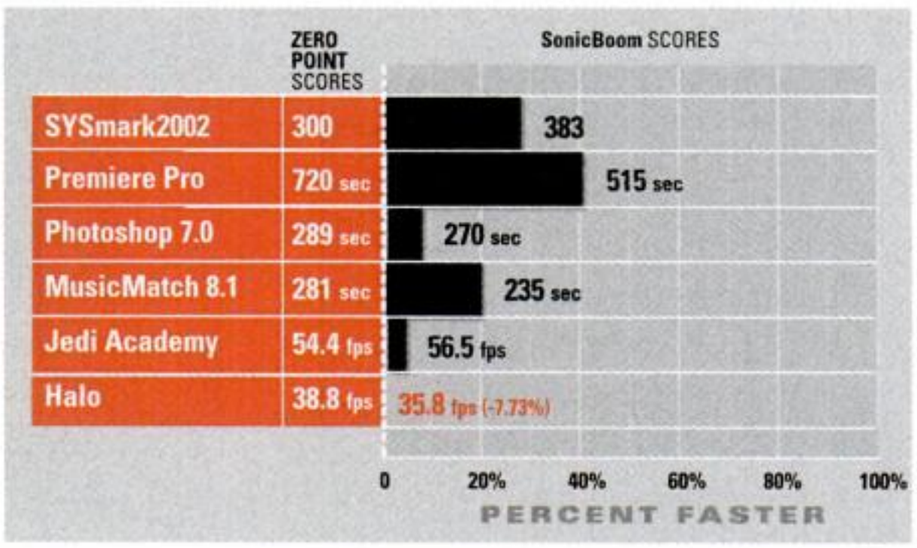
The real star of the SonicBoom is the P4 Extreme Edition. This Intel chip and its fat-ass 2MB L3 cache surpassed the competition in last month's CPU benchmark battle. The up-clocked P4EE did the same thing here, chewing its way through the application benchmark *SYSmark2002* with results that will only fuel AMD-believers' accusation that the test is biased towards Intel.

The P4EE does legitimately blow away the Athlon 64 FX in our new *Premiere Pro* benchmark, which creates a short video with transitions and then encodes it to MPEG-2. Oh, how twisted the tech world can get: For the last three years, the Athlon spanked the Pentium 4 in *Premiere*, and now the P4 is better. Go figure. The P4's clock speed advantage also paid dividends in our *MusicMatch 8.1* tests, where we encode a high-quality MP3 from WAV.

The SonicBoom performed admirably in *Photoshop 7.0*, turning in a score about 7 percent faster than our AMD 64 FX-based zero point. We saw just a nominal speed boost in *Jedi Academy*, and the SonicBoom suffered in *Halo*, where it was 7 percent slower than our zero point.

UNDER THE HOOD

THE BRAINS	
CPU	Intel 3.2GHz overclocked to 3.37GHz Pentium 4 Extreme Edition
Mobo	ABIT IC7-MAX3 using Intel 875P chipset
RAM	1GB DDR400 Corsair Micro (two 512MB sticks)
I/O ports	PS/2 keyboard, PS/2 mouse, six High Speed USB 2.0, three FireWire 400, Gigabit Ethernet, three analog out, mic in, line in
LAN	Intel Gigabit Ethernet
DISPLAY	
Videocard	ATI Radeon 9800 XT (378MHz core, 337MHz DDR)
Monitor	NEC FE2111sb (20-inch viewable CRT)
STORAGE	
Hard drives	Two Western Digital WD360 (10,000rpm SATA, 8MB cache), configured in RAID 0 using onboard RAID
Optical	Pioneer dual-format DVD+R\RW (4x DVD+R, 4x DVD-R, 16x CDR); Plextor Premium 52x CD-R burner
AUDIO	
Soundcard	Sound Blaster Audigy 2 X Gamer
FINE DETAILS	
Case	Cooler Master Wave Master, 465-watt Enermax power supply
Fans/extras	Five fans including a two-fan PCI card cooler
Mouse	Logitech Elite Wireless DUO
Keyboard	Logitech Elite Wireless DUO
BUNDLE	
Windows XP Home	
BOOT: 65 sec.	**DOWN: 34 sec.**


ZERO POINT SCORES
SonicBoom SCORES
SYSmark2002 300 383
Premiere Pro 720 sec 515 sec
Photoshop 7.0 289 sec 270 sec
MusicMatch 8.1 281 sec 235 sec
Jedi Academy 54.4 fps 56.5 fps
Halo 38.8 fps 35.8 fps (-7.73%)
0 20% 40% 60% 80% 100%
PERCENT FASTER

Our zero-point system includes: a 2.2GHz Athlon 64 FX-51, an Asus SK8N motherboard, 1GB of Corsair Registered TwinX DDR400 RAM, an ATI Radeon 9800 XT, a 250GB Western Digital WD2500JB hard drive, Plextor PX-708A DVD burner and a PC Power and Cooling TurboCool 510 Deluxe power supply.

MAXIMUM PC VERDICT 9

+ YELLOW SUBMARINE

Pentium 4 Extreme Edition takes charge.

– YELLOW SNOW

Overclocked CPU means no Intel warranty for your chip.

$3,983, ($3,384 w/o speakers and display)
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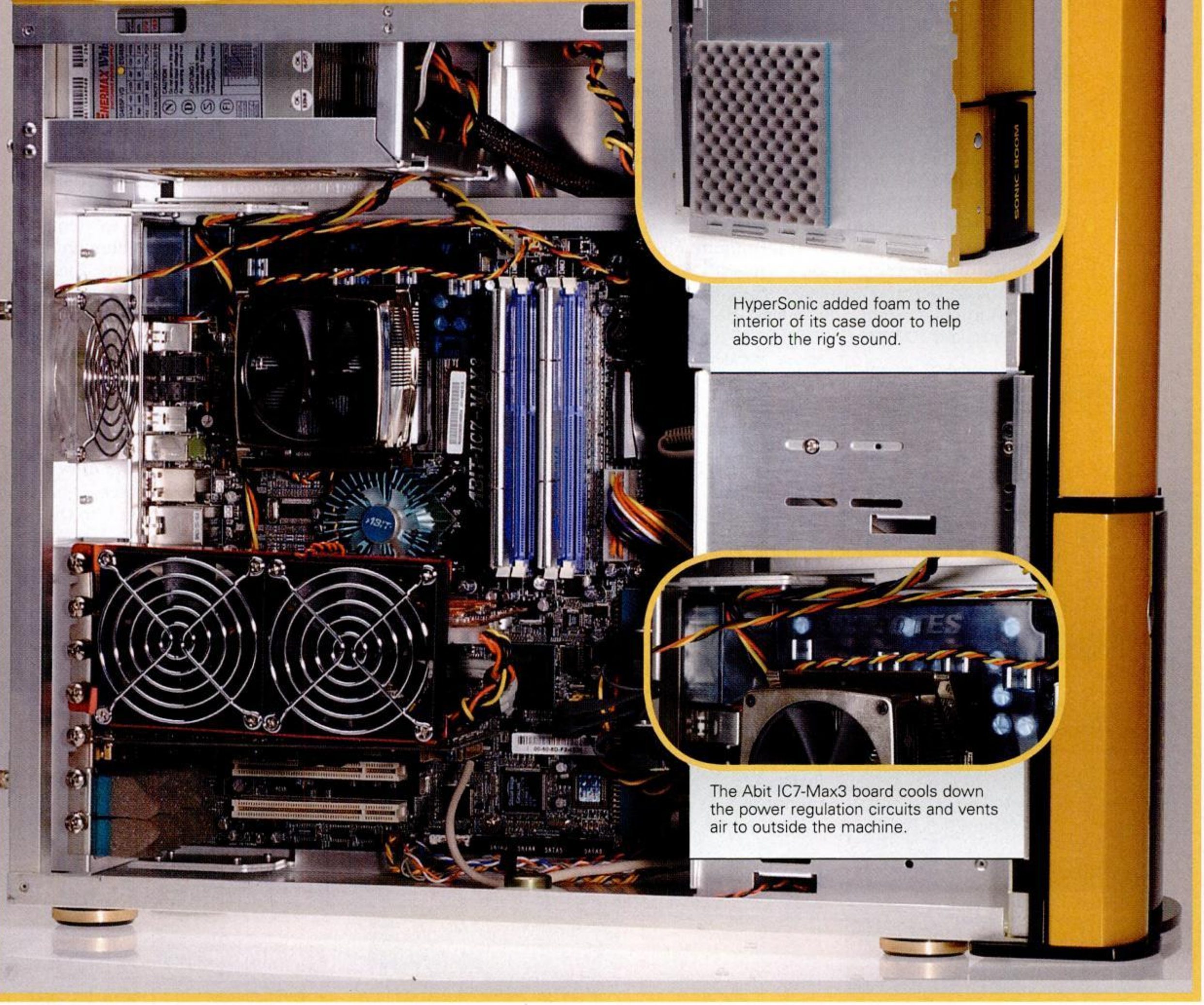
The SonicBoom's paint job is tasteful and well done.

Few vendors actually received the P4EE, but HyperSonic somehow managed to wrestle one out of Intel.

HyperSonic added foam to the interior of its case door to help absorb the rig's sound.



The Abit IC7-Max3 board cools down the power regulation circuits and vents air to outside the machine.

Hands down, our biggest gripe with the Pentium 4 Extreme Edition is its price. At $925, it costs even more than the Athlon 64 FX-51, and pushes the SonicBoom to a stratospheric $3,983.

It's clear that HyperSonic invested a lot of TLC in its SonicBoom, and we appreciate that. While a few areas could stand improvement—a third drive for bulk storage, an Audigy 2 ZS, and a different cooling fan would all be welcome—you couldn't ask for more power from a modern machine.

—GORDON MAH UNG

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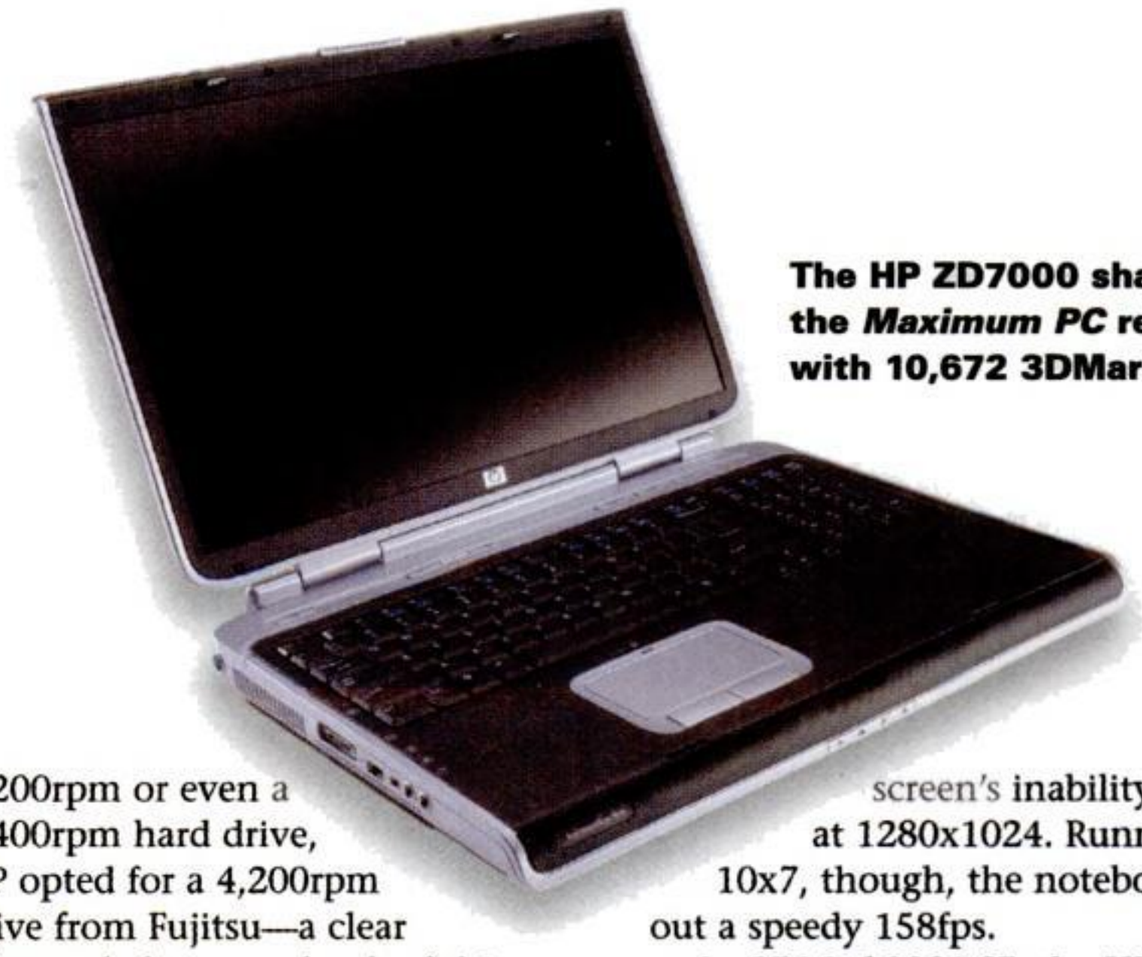
Hewlett-Packard Pavilion ZD7000

Almost the ultimate desktop replacement



The HP ZD7000 shattered the *Maximum PC* record with 10,672 3DMarks.

If you're going to make a big-ass notebook, you have to go all the way. After all, what's the point of packing in all that power if the components aren't up to par? Such was the paradox of the Toshiba Satellite P25 we reviewed in October. That notebook was huge and brimming with potential, save for its ill-suited, underpowered GeForce FX Go5200 graphics chip.

Hewlett-Packard didn't make that particular mistake with its mammoth ZD7000. Boasting nVidia's state-of-the-art GeForceFX Go5600, a 3.2GHz Pentium 4 running on an 800MHz bus, and 1GB RAM, this wide-screen wonder is a gaming notebook if ever there was one. HP even opted for the 128MB frame-buffer version of the Go graphics chip, which gives games added oomph.

It's not perfect, mind you; the ZD7000 has just a 4,200rpm hard drive. Instead of putting in a 7,200rpm or even a 5,400rpm hard drive, HP opted for a 4,200rpm drive from Fujitsu—a clear mismatch for a notebook of this caliber. We're not really sure what the motivation was, beyond possibly saving a little power. Fortunately, 60GB and 80GB drive options are available for slightly improved performance.

Like Toshiba's behemoth, the ZD7000 features a 17-inch screen with a maximum resolution of 1440x900.We appreciated the screen's crisp, clear image and off-axis visibility. The Harmon Kardon speakers are also noteworthy. And in a move that will surely have entry clerks spinning in their office chairs, HP included a 10-key pad. This might not wow the average Jane or Joe, but for folks who know how to 10-key, yee haw! Structurally, the notebook seems rock-solid.

On the performance front, the ZD7000 both screams and whispers. We saw stellar scores in the CPU-intensive *Premiere 6.0* test—HP's 3.2GHz P4 smoked Toshiba's 2.8GHz P4 by about 13 percent, which corresponds with the 12 percent clock speed differential. The ZD7000 also bested Toshiba's Satellite P25 in our notebook *Photoshop* script by 39 percent. As with the P25, we had to forgo the Maximum PC Quake III Arena demo because of the wide-screen's inability to run at 1280x1024. Running at 10x7, though, the notebook spit out a speedy 158fps.

In *3DMark2001 SE*, the HP punched out a *Maximum PC* record of 10,672 3DMarks. This beats out the Radeon Mobility 9600 chip in the Voodoo M460 notebook by about 1,500 points. (The M460 had a slower CPU and lacked dual-channel DDR support, so we don't see this as a total referendum on the Mobility 9600 chip just yet.) The HP system also turned in an admirable 2,703 in *3DMark2003* (remember this is still a notebook, folks).

The tables turned for the ZD7000 in *SYSmark2002*, where the scores fell below those of the Satellite P25. How is this possible considering the ZD7000's 400MHz advantage? We suspect the wimpy hard drive of dragging down the Office Productivity scores and in turn the overall number.

While it appears that HP couldn't find the more favorable DDR400 in SO-DIMM sizes, the ZD7000's DDR333 is still better than the DDR266 in Toshiba's Satellite P25.

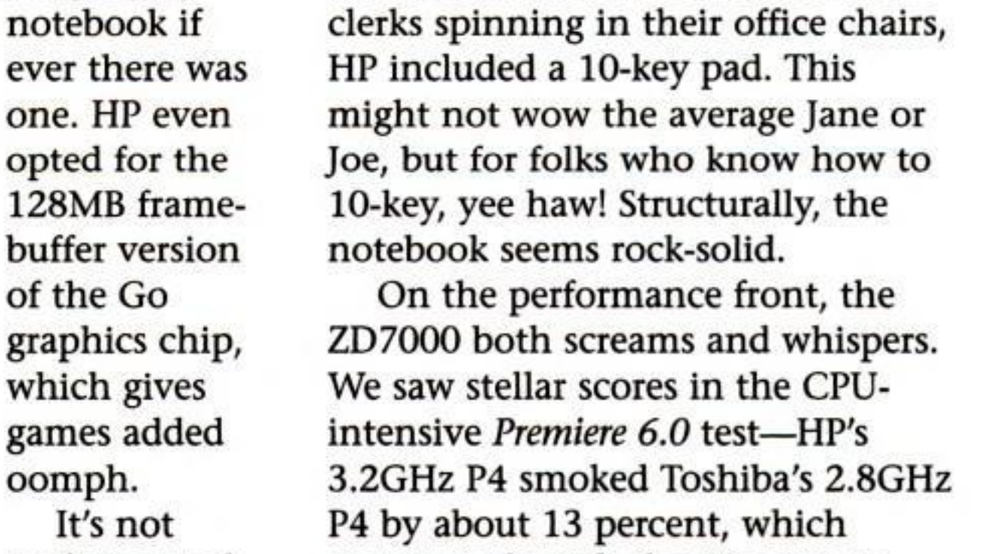
The ZD7000 will play a DVD for about 100 minutes before giving up the ghost. That's not great and is about 30 fewer minutes than the Satellite P25 offers. But face it: You don't buy a notebook this big to play DVDs on the road. Hell, you couldn't even open this monster in coach class.

With a faster hard drive, the ZD7000 could be the ultimate desktop replacement.

—GORDON MAH UNG

UNDER THE HOOD

THE BRAINS	
CPU	3.2GHz Pentium 4C with Hyper-Threading and 865PE/ICH5 chipset
RAM	1GB DDR333 running in dual-channel mode.
I/O ports	Parallel, four Hi-Speed USB 2.0, Fast Ethernet, S-video out, video out, mic, headphone, Card Bus PC Card slot
Modem	Conexant 56K ACLink Modem
LAN	Broadcom 54G supporting 802.11B/G Realtek RTL8139 Fast Ethernet
DISPLAY	
Video	nVidia GeForce FX Go5200 (200MHz core / 203MHz DDR)
Display	17-inch (1440x900@32-bit)
STORAGE	
Hard drive	Fujitsu MHT2040AT 40GB 4,200 RPM
Optical	HL-DT Panasonic UJ-811 (2x DVD-RAM, 2x DVD-R, 1x DVD-RW, 16x CD-R, 8x CD-RW, 8x DVD-ROM, 24x CD-ROM)
AUDIO	
Audiochip	Realtek AC97
OTHER	
Infrared port, SD/MMC, Smart Media reader	
TIPPING THE SCALES	
Lap Weight	9.3 lbs
Carry Weight	10.8 lbs
BUNDLE	
Windows XP Home, Word, Excel, Powerpoint, Outlook, Money 2003, Works 7.0, Office XP Standard, Quicken 2003, TrendMicro OfficeScan, NVDVD, Muvee Autoproducer, Memories Disc Creator 2.0	
BOOT: 82 sec.	**DOWN: 12 sec.**



*Our zero-point notebook is a Dell Dimension 8200, and includes a 1.7GHz P-4M CPU, 256MB DDR266, a 64MB 128-bit DDR GeForce4 Go graphics chipset, and a 5400rpm IBM Travelstar 60H hard drive. *Our notebook Photoshop 7.0 test differs from our new desktop Photoshop test.*

MAXIMUM PC VERDICT 9

+ 747

Top-end nVidia graphics part, 3.2GHz Pentium 4, and a 10-key pad.

– 7-11

4,200rpm hard drive.

$2,700, www.hp.com

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“ It's a stylish system with enough horse-power for graphics-guzzling games. ”

- PCupgrade Magazine Oct 2003

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AI 4600 64Bit

Audacious specs at a reasonable price

It sure is packed with drives! The wiring job ain't pretty but at least it's neat.

It's no head-turner, but it's got substance.

Ever since its much belated debut in September, the AMD64 has received a lukewarm reception from the top-tier vendors—thus far, not one of the big guys (Dell, IBM, HP, etc) has offered AMD's 64-bit protégé a place in its product line. On the other hand, smaller vendors—especially gaming rig outfitters—have been quite willing to embrace AMD's 64-bit vision. Indeed, in the past few months, the supercharged AMD64 FX-51 proc has appeared in a number of outrageous, boutique PCs. AI Computers wasn't the first with an AMD64 machine, but its recently released AI 4600 offers a refreshing blend of extreme specs and a reasonable price.

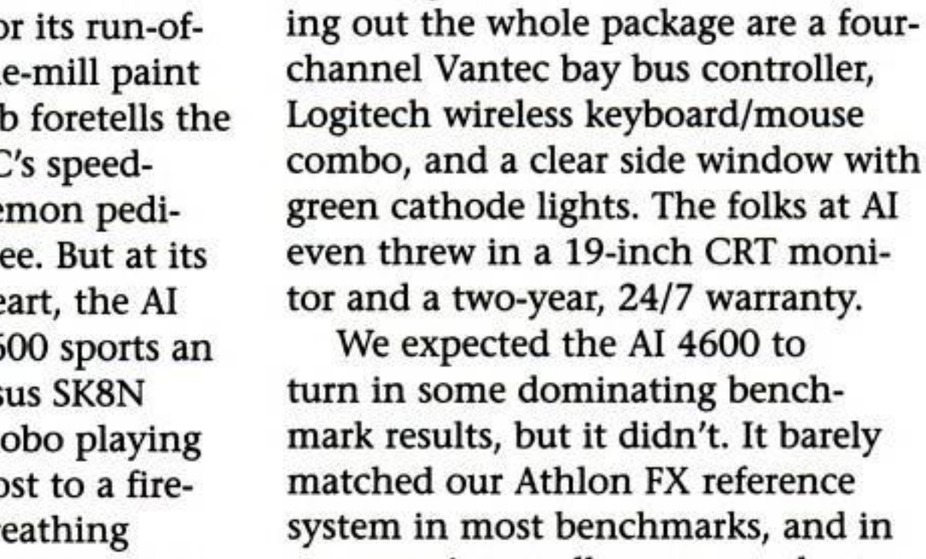
UNDER THE HOOD

THE BRAINS	
CPU	AMD Athlon 64 FX-51 (2.2GHz)
Mobo	Asus SK8N (Socket-940, nForce3 Pro chipset)
RAM	1GB Registered DDR333 Infineon (two 512MB modules)
I/O ports	Six USB, one serial, one parallel, three IEEE 1394
LAN	nVidia Fast Ethernet (integrated)
DISPLAY	
Videocard	256MB nVidia GeForce FX 5900 Ultra (450MHz core, 425MHz DDR)
Monitor	19-inch A.I. CRT
STORAGE	
Hard drives	Two 36GB Western Digital WD360GD Raptors (10,000rpm SATA), via integrated Promise RAID chip, one 200GB Western Digital WD200JD (7,200rpm Ultra ATA)
Optical	One Plextor dual-format DVD burner (8x DVD+R, 8x DVD-R, 40x CDR), one Samsung 16x DVD-ROM
Other	One 1.44 MB floppy drive
AUDIO	
Soundcard	Sound Blaster Audigy 2 ZS 7.1
FINE DETAILS	
Case	Chieftec case, Enermax 430-watt power supply, two green cold-cathode light tubes
Fans/extras	Three 80mm Vantec Stealth case fans, Zalman CPU fan, 4-channel fan speed controller
Mouse	Logitech Cordless
Keyboard	Logitech Cordless
BUNDLE	
Windows XP Pro	
BOOT: 50 sec.	**DOWN: 22 sec.**

Out of the box, our AI 4600 looked unremarkable. Neither its steel Chieftec case nor its run-of-the-mill paint job foretells the PC's speed-demon pedigree. But at its heart, the AI 4600 sports an Asus SK8N mobo playing host to a fire-breathing AMD64 FX-51 chip. And that's not all. This machine boasts an exhaustive list of respectable supporting components.

One gig of main memory means the Windows swap file will likely see little action. A pair of 10,000rpm hard drives in a RAID 0 arrangement (73GB) and an auxiliary 200GB hard drive work together to serve up both blazing speed and ample capacity. A Plextor 8x dual-format DVD burner and a 16x DVD-ROM drive are on optical detail. A 256MB nVidia GeForce FX 5900 Ultra videocard and a Creative Labs Sound Blaster Audigy 2 ZS 7.1 soundcard guarantee top-notch sights and sounds. And rounding out the whole package are a four-channel Vantec bay bus controller, Logitech wireless keyboard/mouse combo, and a clear side window with green cathode lights. The folks at AI even threw in a 19-inch CRT monitor and a two-year, 24/7 warranty.

We expected the AI 4600 to turn in some dominating benchmark results, but it didn't. It barely matched our Athlon FX reference system in most benchmarks, and in two tests it actually came up short—the AI 4600 was 4.6 percent and 7.2 percent slower than our test bed in *Premiere Pro* and *Halo*, respectively.



Our zero-point system includes: a 2.2GHz Athlon 64 FX-51, an Asus SK8N motherboard, 1GB of Corsair Registered TwinX DDR400 RAM, an ATI Radeon 9800 XT, a 250GB Western Digital WD2500JB hard drive, Plextor PX-708A DVD burner and a PC Power and Cooling TurboCool 510 Deluxe power supply.

We attribute the poor *Premiere* score to AI's questionable use of DDR333 (PC2700) memory instead of the faster DDR400 (PC3200) memory that we have planted in our reference rig. AI promises that, by the time you read this, DDR400 memory will be the standard, for not a penny more. In the two weeks since we received our review system, AI has also replaced the AI 4600's now-dated FX 5900 videocard with the speed-bumped FX 5950 (also at no extra cost), which should help address the video performance deficit. But even with the slower memory and video performance of our early edition AI 4600, the rig still holds its own against systems of comparable price.

Compared with the blistering performance of the P4EE-powered (and overclocked) SonicBoom system featured on page 68, the AI 4600 has to settle for runner-up status in a raw speed contest. Its appearance is also far less alluring than the SonicBoom's. But speed and style aside, the AI is a better-equipped machine by a wide margin. Consider the 4600's 8x DVD burner, secondary 200GB hard drive, and Audigy 2 ZS soundcard—all tasty treats that the SonicBoom lacks.

The P4EE clearly has the AMD64 FX trounced in most benchmarks. But Intel's Xeon-derived chip and systems based on it are pricey and don't offer an upgrade path to the impending 64-bit edition of WinXP. It's a toss-up, but if you decide to go AMD, the AI 4600 will do you right.

—DWIGHT LOOI

MAXIMUM PC VERDICT 8

ARTIFICIAL INTELLIGENCE

Over-the-top specs, attractive pricing.

ARTIFICIAL FLAVORING

Not as fast as Intel; low-rent case and paint job.

$3,650, www.aicomputers.com

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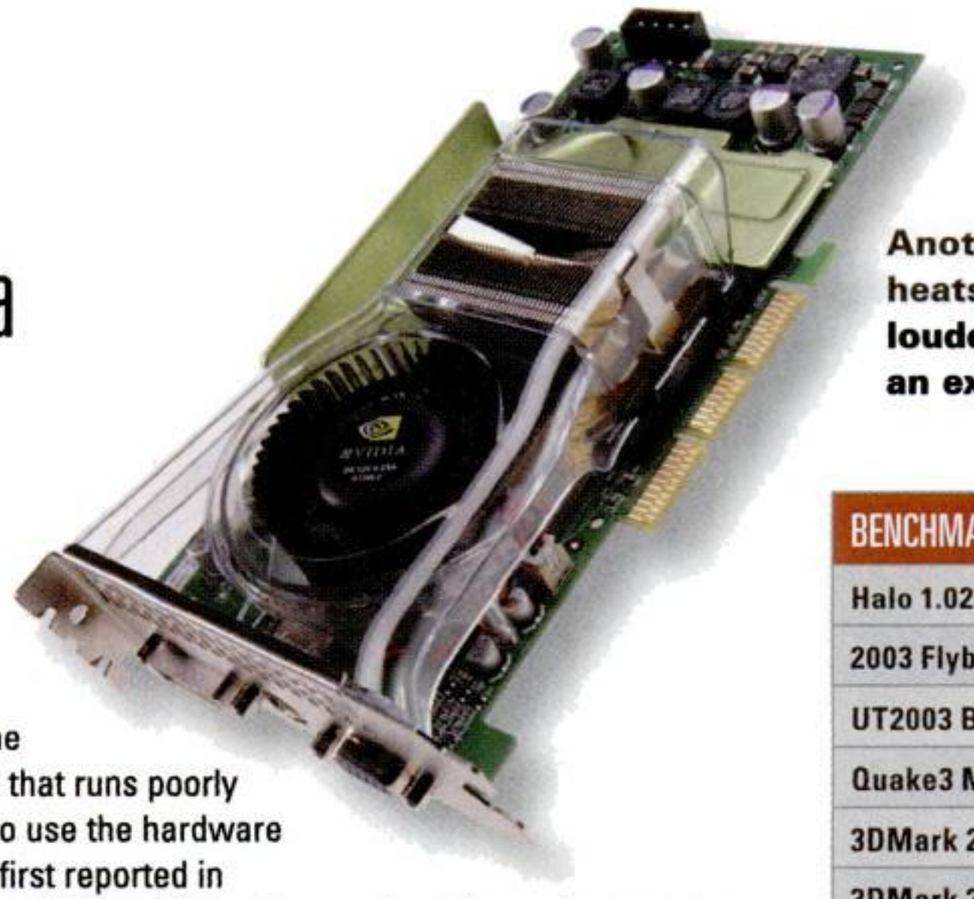
PNY Verto GeForce FX 5950 Ultra

nVidia's new chip ain't half bad



Another nVidia card, another new heatsink design. This one is a bit louder than the 5900 design, but an extremely effective cooler.

The Verto is the first board based on nVidia's GeForce FX 5950 Ultra chipset that we've tested. It's essentially the same videocard as the original 5900 with slightly faster clock speeds and a dollop of secret sauce.

The secret sauce takes the form of 52.16 drivers. The new drivers include a compiler that grabs shader code that runs poorly on the GeForce FX GPU and rearranges key functions to use the hardware more efficiently. This should help address an issue we first reported in November 2003—a speed deficiency that resulted when GeForce FX hardware ran DirectX 9 games such as *Halo*, *Tomb Raider: Angel of Darkness*, and *Half-Life 2*.

nVidia claims these optimizations have zero impact on image quality. To test this, we did side-by-side comparisons between this Verto board and the Radeon 9800 XT (reviewed last month), using every available DirectX 9 game. We were unable to discern any shader inconsistencies between the two, and visual quality with the Verto was as good as or better than that of the GeForce FX 5900 with the older 4x series of drivers in all the games we tested.

The Verto's benchmark performance was neck and neck with the Radeon 9800 XT. The former's 475MHz DDR-II memory gives it significantly more memory bandwidth than the 9800 XT, resulting in a slight advantage in fill-rate limited games. The new drivers and faster 475MHz core also allowed the Verto to overtake the Radeon in shader-limited apps. It's worth emphasizing that the two boards were extremely close in every benchmark we ran. In fact, the cards scored so closely, they're within the margin of error in several of the benchmarks we use.

The real problem with this card is that it features the third revision of a chip that has only been on the market since June. Given the recent delays of two high-profile programmable shader games—*Half-Life 2* and *Doom3*—it just doesn't make a whole lot of sense to buy an NV30 or R300 generation product.

—WILL SMITH

BENCHMARKS	Verto 5950 Ultra	Radeon 9800 XT
Halo 1.02	**26.20**	25.62
2003 Flyby	**152.2**	146.3
UT2003 Botmatch	69.6	**71.3**
Quake3 MPC	**147.4**	145.1
3DMark 2003 Game 2	**45.4**	45.1
3DMark 2003 Game 4	**36.8**	36.2
3DMark 2003 Overall	6182	**6322**

All benchmarks were run on our 3GHz Pentium 4 videocard test bed. All benchmarks are run at 1600x1200 in 32-bit color, except for *3DMark2003* tests, which are run at their default resolutions. Bet you didn't know that the stomach of a hippopotamus is nearly 10 feet long.

MAXIMUM PC VERDICT 9

+ DR. PEPPER

Damn fast, and the problems with programmable shaders seem to be a thing of the past.

– MR. PIBB

When the next-gen parts from nVidia and ATI hit in the spring, this card is going to be obsolete.

$500, www.pny.com

Palm Tungsten T3

Palm's pretty new handheld goes both ways

The new T3 gives you a well-designed portrait mode.

As far as sequels go, T3 is horrible. Bad. Ugly. A big waste of money. Oh, wait, that's Arnold Schwarzenegger's last film. Palm's T3 is the exact opposite of the latest Terminator movie: It's a sequel that actually bests its predecessors.

Among the most significant changes to the Tungsten T3 is a new landscape mode that makes for a more readable Internet browsing experience than most PDAs. And it couldn't be easier to use: When you flip the screen from vertical to horizontal, the directional pad automatically changes configuration. Palm also adds a virtual graffiti area to the T3 that offers backlighting for writing in the dark, easily converts to a keyboard for hunt-and-peck entry, and tucks away to give you more desktop space.

The T3's screen is a 320x480 transflective display that's sharp, bright, and offers fair off-axis viewing. The color depth is excellent, and although the screen and graphics controller have the same 16-bit rating as the Tungsten C, the T3 looks far superior. Speed-wise, the T3 operates at a snappy pace thanks to the 400MHz Intel Xscale CPU. Instead of skimping on memory, Palm wisely chose to use a full 64MB of RAM, 52MB of which are available to the user. Unfortunately, while onboard Bluetooth and a rechargeable Lithium Ion battery are included, the T3 lacks onboard Wi-Fi.

The Tungsten's biggest drawback is that none of its new features represents a breakthrough in technology or performance. The defunct HandERA (formerly TRG) had workable landscape modes years ago. Sony has long offered high-res screens in its PDAs. And the fastest Xscale has been calling the shots in other PDA bodies for many months now.

But this new handheld isn't really about being first—it's about integrating all these features into a polished, well-rounded package. Palm has accomplished that. The T3 is just the right size, and sports just the right amount of RAM and just the right amount of power. Overall, the Tungsten T3 is a cut above its predecessors and a fine PDA.

—GORDON MAH UNG

SPECS	
CPU	400MHz XScale
RAM	64MB (52MB useable)
Screen	320x480@16-bit transflective
Connectivity	infrared, Bluetooth
Weight	5.5 ounces
Other	Expansion port, SDIO port, docking cradle included
Software	OS 5.2 Documents To Go 6.0 Professional, Acrobat Reader, Palm BlueBoard, BlueChat, PowerOne, Personal Calculator, Solitare

MAXIMUM PC VERDICT 9

+ COLD PIZZA

Tiny and powerful, and contact info now tracks birthdays and instant messaging.

– COLD CORN DOGS

Sticky power button.

$400, www.palm.com

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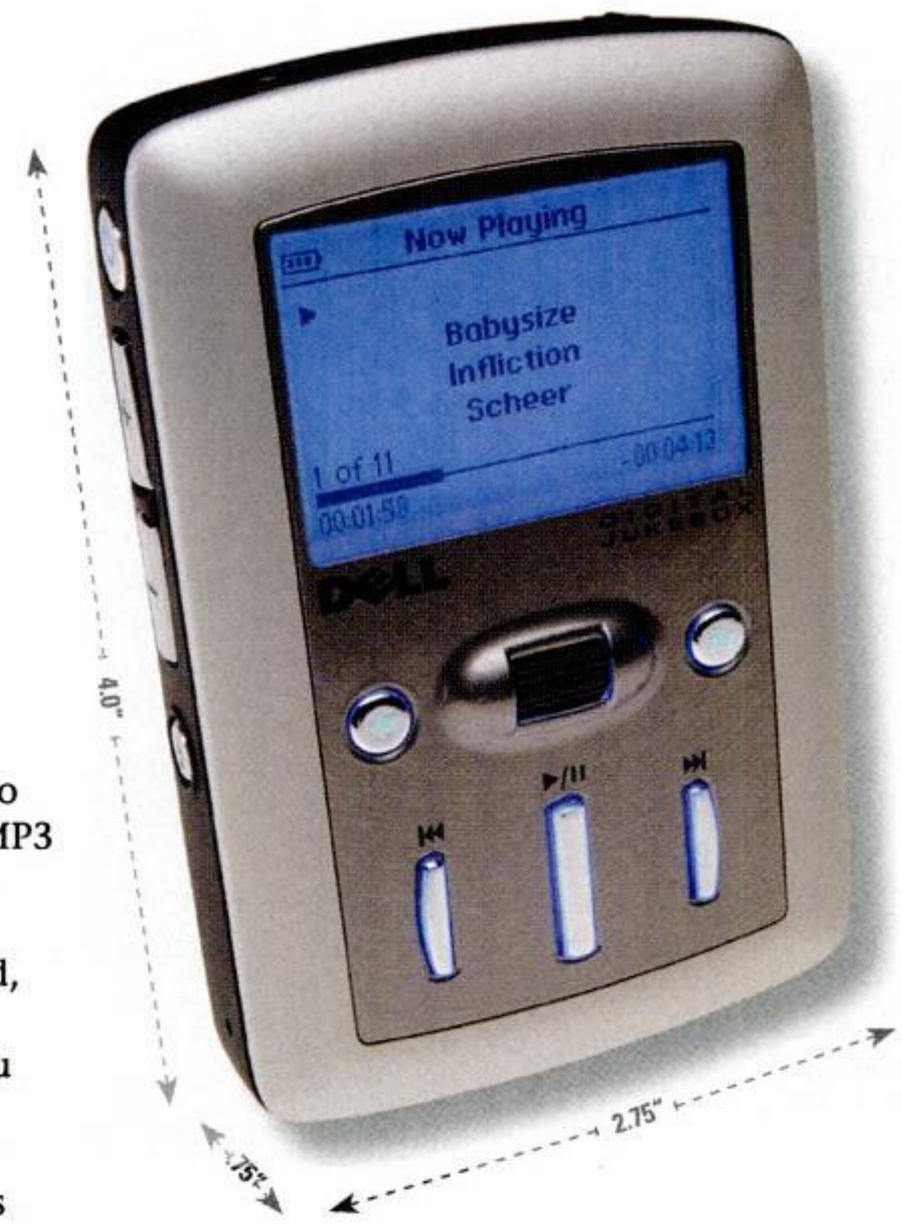
Dell Digital Jukebox

Entering the MP3 fray in a big way



Dell busts out with an MP3 player that could become the first real challenger to Apple's iPod.

We knew about the *farmer* in the Dell, but we had no idea a hard drive–based MP3 player was in there too. And it's a pretty damn good one. In fact, if the iPod is too rich for your blood, the Dell Digital Jukebox ought to be one of the first alternatives you check out.

The Digital Jukebox ("DJ"—get it?!) could easily pass as the iPod's scruffy younger brother; you know, the one who took kickboxing instead of culinary arts. It possesses a handsome faceplate, comfortable rounded corners, rubberized edges, and is less likely than the iPod to look like hell if it goes a week without its protective covering. The DJ is also smaller and lighter than Creative's Nomad Jukebox Zen Xtra. Sounds good so far.

Like the Zen Xtra, however, the Dell DJ's buttons are distributed in a haphazard manner that doesn't make for intuitive operation. The scroll barrel in the center is a nice touch, but it protrudes from the player's face, so you have to lock the player before dropping it in a pocket, or you may inadvertently activate a menu or switch tracks. Once the player is loaded and locked, you'll be amazed at the sound quality. Out of the box, we rate the Dell DJ a hair above the Zen Xtra, particularly at high-frequencies. The sound can be adjusted to personal taste with either the EQ presets or your own custom setting using the four-band graphic EQ. And, thankfully, the Dell DJ gets loud enough to blow your contact lenses off.

Although the Dell DJ never skipped during an arduous 10-minute jog, daily use did reveal one annoying issue. Pressing a button to skip to the next track doesn't always yield an immediate response. The current track keeps playing, and several seconds may pass before the player actually advances to the next song. If you hump the button in frustration, the player jumps forward several tracks and can't be stopped. And alas, like the Zen Xtra, you can't hear your music when you search within a track, and you need a special app to load the player with data files.

Having played with *iTunes* at length, we're more assured in our suspicions about *MusicMatch Jukebox* as a portable audio manager—it's hopeless. Worse yet, the bundled crippleware version of *MusicMatch* is so stingy that it restricts even a simple, essential function like CD audio ripping to a top speed of 6x.

Nonetheless, the Dell Digital Jukebox stands shoulder-to-shoulder with the Zen Xtra. With better software, a firmware upgrade, and a more graceful button layout, the Dell DJ could turn out to be the first real challenger to the iPod.

—LOGAN DECKER

MAXIMUM PC VERDICT 8

+ OGG VORBIS

Great sound and beefy volume in a small, handsome package.

– RIGOR MORTIS

The firmware could use an update, and *MusicMatch* has got to go.

$330, www.dell.com

Annual MaximumPC Newstand-only PC How-To Guide Special Issue

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A Big Bowl of Serial ATA

With almost a terabyte of storage and 32MB of cache between them, these SATA drives are as good as it gets

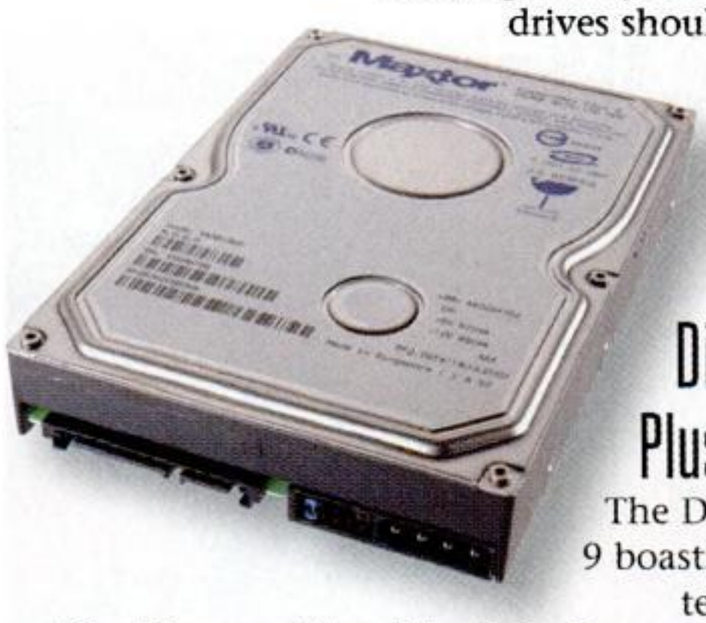
The Serial ATA version of Western Digital's much-loved Caviar SE drive is actually a tad slower than the parallel ATA version.

SATA has arrived, so it's high time for a shootout. For your purchasing pleasure, we gathered together the top-of-the-line drive from each manufacturer and made the lot of 'em fight like wild boars over a stray tourist. As we so eloquently state in our Hardcore Hardware preview feature (page 26), Serial ATA is the hip new interface for 2004. Not only will the skinny SATA connector help your case's airflow, but members of the opposite sex will be impressed by your tiny hard drive cable. Seriously, they will.

Longtime readers will note a subtle change to our benchmarking suite, namely the absence of the server-centric *IOMeter* and the appearance of a new test called *H2Benchw*. For more details on these changes, please see In the Lab on page 66; a brief explanation can be found at the bottom of the benchmark chart.

So without further ado, let's meet the contestants. If you want a truly future-proof system, one of these drives should take up residence in your PC post haste.

—**JOSH NOREM**



The DiamondMax Plus 9 is the hard drive equivalent of the strong, silent type.

Maxtor DiamondMax Plus 250GB

The DiamondMax Plus 9 boasts three 83GB platters, and comes with both the hot-swappable SATA power connector and the older four-pin ATX version. While the drive didn't place at the top in any of the benchmarks, it never brought up the rear either.

Given its overall strong performance, we were somewhat surprised to see the Maxtor drive achieve the lowest score in *H2Benchw's* "real world" application index test. Interestingly, this dearth of desktop horsepower reappeared in our other real-world test, Bapco's *SYSmark 2002* Office Productivity script.

All in all, the DiamondMax seems to offer respectable performance, but nothing we haven't seen before. If running a quiet PC is your top priority, however, this drive's fluid-bearing motors make it one of the most peaceful we've recently sampled.

Maxtor DiamondMax

MAXIMUM PC VERDICT 8

+ GIGABYTE

Respectable performance across the board, and quiet.

– SNAKE BITE

Sluggish "real world" performance.

$250, www.maxtor.com

Western Digital Caviar SE WD2500JD

Western Digital has remained at the forefront of ATA hard drive performance for a while now with its "Special Edition" 2500JB drives. The Caviar 2500JD is essentially the same JB we all know and love, albeit with 250GB of storage. It uses the *de rigeur* triple-dose of 83GB to reach this capacity.

If you take a gander at the benchmark chart on the opposite page, the WD's burst speeds should stand out as being shockingly low. While the Maxtor and Hitachi drives can retrieve data from cache at rates exceeding 100MB/s, the Western Digital dishes out data at 70MB/s. While it's surprising to see such a low burst rate, it's important to keep in mind that sustained transfer rates are more indicative of a drive's overall performance, simply because a drive isn't always reading from its cache. And when it comes to sustained transfer rates, the Caviar drive is the fastest of the bunch.

Western Digital isn't totally out of the woods, though—the Caviar is possibly the loudest drive in the roundup and has the highest access times. Apparently, this latter fact didn't hinder the drive's *H2Benchw* application index performance, as it posted the second fastest score in the group (by a hair). The drive also posted the highest score in Bapco's Content Creation test, so we can only conclude that the lightning-fast read and write times help offset slow burst and seek performance.

Western Digital Caviar

MAXIMUM PC VERDICT 7

+ CAVIAR

Highest read/write speeds in the group, cool connector.

– PATE

Slowest seek times, lowest burst rates, loud operation.

$280, www.westerndigital.com

On a final note, we appreciate the special connector, dubbed SecureConnect, included with the 2500JB. Western Digital claims it provides a cable-to-drive connection that's 500 percent stronger than standard SATA cable. We believe it—the connector's wide body virtually ensures it won't wriggle loose.

Hitachi Deskstar 7K250

In case you weren't aware of it, Hitachi recently purchased IBM's hard drive division, and this is the first product to emerge from that transaction. IBM has a history of creating exceedingly fast hard drives, but that success has been tempered somewhat by the class-action lawsuits over its 75GXP "Deathstar" drives, which were prone to crashing without notice. Despite this litigious backdrop, the 7K250 still makes a compelling argument in favor of the Deskstar line.

If you glance at the benchmark chart, you'll notice a lot of bold print in Hitachi's column. Even

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BENCHMARKS				
HD TACH	**IBM**	**Maxtor**	**WD**	**Seagate**
Sequential read (MB/s)	47.57	47.56	**47.72**	44.40
Burst speed (MB/s)	**113**	105	70	83.4
Random access (milliseconds)	**11.9**	13.5	13.7	12.6
SYSMARK				
Office Productivity	**168**	157	166	166
Content Creation	284	277	**287**	277
H2BENCHW				
Random access read (MB/s)	**12.04**	13.72	14.66	12.78
Burst read (MB/s)	**116.16**	101.91	71.61	88.12
Sustained read avg. (MB/s)	46.86	47.27	**47.97**	44.62
Sustained write avg. (MB/s)	44.76	47.20	**47.86**	44.69
Application index *	**24.6**	18.6	19.7	19.5

Best scores are bolded

** The application index is meant to provide an indication of "real world" desktop performance in Windows XP. It's based on a prerecorded script of heavy hard drive activity using six desktop scenarios. The index is the geometric mean of the results of the six tests.*

SPECS				
	Hitachi	**Maxtor**	**WD**	**Seagate**
Capacity	250GB	250GB	250GB	160GB
Buffer size	8MB	8MB	8MB	8MB
Warranty	3 years	3 years	3 years	1 year

The 7200.7 is the only drive in the group to offer true "native" SATA support; the other drives use a parallel ATA to Serial ATA bridge. Looks "futuristic," doesn't it?.

There's a new sheriff in town, folks. The first drive to emerge from the Hitachi/IBM marriage is laying down the law.

Hitachi Deskstar

MAXIMUM PC VERDICT 9

+ TATTOOINE

Blistering performance across the board, ninja-like.

– DEATHSTAR

Pricey.

$350, www.hgst.com

though the drive is a three-platter (83GB a piece), the 7K250 was the leader in practically every benchmark, and in the few tests where it wasn't the fastest, it nipped at the heels of the leaders. Burst rates towered over the other drives, seek times hovered just below the rest, and the drive's application index performance put it in a category of its own. The 7K250 also sports fluid-dynamic bearings, making it whisper quiet. This drive is the most expensive in the roundup, but given its performance, it's easy to see why.

Seagate Barracuda 7200.7

The 'Cuda stands out in this crowd as the only native SATA drive; the other drives use an ATA/100 interface with a bridge to the SATA controller. As the benchmark performance shows, however, this design feature offers no real benefits at this time. The presence of native SATA also required the removal of the drive's four-pin ATX power connector, so if your power supply doesn't include a SATA plug, you'll have to spring for the $5 adapter. At 160GB (two 80GB platters), Seagate's drive is the smallest drive in this roundup.

The Barracuda 7200.7 posted benchmark scores that place it squarely mid-pack. Its burst speeds aren't even up to ATA/100 speeds, though, which is what we experienced with the Caviar drive.

The 'Cuda did score second-best in the seek-time test, and performed respectfully in all other benchmarks as well. We found it reasonably quiet when idle, but a tad loud during operation. Overall the Barracuda is a solid performer across the board. The only thing we can really complain about is its warranty. While the other three drives are guaranteed for three years, Seagate covers for just one.

Seagate Barracuda

MAXIMUM PC VERDICT 8

+ 'CUDA

Solid performance and good seek times.

– CUJO

Limited warranty and a wee bit loud.

$160, www.seagate.com

If Size is More Important Than Speed

Maxtor DiamondMax Plus 16 300GB

Maxtor's 300GB, 5,400rpm DiamondMax is the perfect foil to the lightning-fast SATA drives in this roundup. The largest-capacity ATA drive available (as of press time, at least), the DiamondMax drive eschews all-out speed in favor of enormous storage, whisper-quiet operation, and a reasonable price tag.

The DiamondMax features four 75GB platters, 2MB of cache, and is spec'd to run at ATA/133 even though it's not even pushing ATA/100 yet. An ATA/133 host adapter is included, but any board with ATA/100 will run it just fine. As the benchmarks illustrate, this drive offers reasonable performance, but the real selling point is its size. If you want the biggest drive available, look no further.

www.maxtor.com, $300

BENCHMARKS	Maxtor 300
H2BENCHW	
Random access read (MB/s)	20.37
Burst read (MB/s)	86.11
Sustained read avg. (MB/s)	38.11
Sustained write avg. (MB/s)	37.67
Application index	12.8

Streaming Box Slugfest

We put two new network media players through their paces

With the c300, all that music you have stored on your PC can be played anywhere in your house.

Massive storage and wanton processing power make a PC the perfect repository for all your audio and video fancies, but that doesn't mean you're confined to a computer when it comes to enjoying your digital riches. After all, a proper hi-fi setup, big-screen TV, and plush, comfy couch possess qualities that a desktop PC simply can't touch.

Sure, it's possible to pipe your digital audio and video through your television and stereo, but you may not have the space or the desire to position your PC alongside your living room entertainment center. And you certainly don't want to add more wires. Luckily, there's an attractive alternative: streaming media players that operate on your existing home network, be it wired or wireless.

—DWIGHT LOOI

cd3o c300 Network MP3 Player

If audio is all you're after, try the cd3o c300. This network player works off an 802.11b or regular 10/100BASE-T Ethernet connection. Setup is a breeze; simply install the music-server CD on your PC and connect the c300 unit to your hi-fi. The software automatically searches for a compatible player on the network, and detects on your PC all the songs you've designated as playable.

The player itself doesn't actually store any music—files are read off your PC's hard drive and streamed to the player in real-time as data packets over your local network. The server software itself plays nicely with other applications—it uses relatively few CPU resources and runs unobtrusively in the background. A full-featured IR remote controller is part of the package.

The Network MP3 Player moniker is slightly misleading, because the unit plays MP3 files, WMA files, and uncompressed WAV files. Its 24-bit/96kHz digital-analog converter offers sound quality on par with the best DACs found in similarly priced CD players. MP3 audio sounds beautiful when piped through the c300, but WAV files sound even more impressive.

The only aspect of the c300 we don't like are its extremely shallow RCA connectors—they're shallow enough that some RCA inputs won't stay firmly attached.

The c300's $200 price tag is reasonable, but should your pocketbook disagree, cd3o also sells the more basic c200 and c100 models (the c100 doesn't support wireless, for instance) for $150 and $130, respectively. However, unlike the cd30's less expensive models, the c300 features an extended-range antenna as well as coaxial and optical digital SPIDF outputs.

cd3o c300

MAXIMUM PC VERDICT 9

AUDIOPHILE

Excellent sound quality, uncompressed audio support, very good software.

PEDOPHILE

A little pricey compared with other products on the market; RCA connectors should be deeper.

$200, www.cd3o.com

Hauppauge Media MVP

If you want to stream more than just shapeless melodies, check out the Hauppauge Media MVP, which works just like the cd3o player except that it serves up still images and video as well as music.

Like the c300, this streaming box doesn't actually store data or files; it feeds on data packets via the network. Setting up the unit is almost as easy as with the c300, except that the Media MVP lacks wireless capability, which means you'll have to run Ethernet cable unless you buy a wireless Ethernet bridge. A set of RCA audio/video connectors and an S-VHS jack provide connectivity to your home entertainment system. The unit's software installs cleanly and works well with other applications. And despite the bargain price, you still get a remote control.

Overall, the Media MVP functions as it should—we didn't experience any bugs or glitches. Unfortunately, the software is somewhat limiting. The only audio format supported is MP3, and BMP image files are a no-no; only JPEGs and GIFs are supported. Furthermore, the player supports MPEG-1 and -2 at speeds up to an adequate 10Mbps (a full-quality DVD video stream is only 8Mbps), but cannot play AVI, MOV, MP4, or other common video formats.

While the Media MVP's audio quality doesn't sound as good as the c300's—voices and music in particular sound dense and flat—it will nonetheless do justice to the majority of MP3s in your library (although, the inferior audio did become more pronounced when we played 320kbps MP3s). The Media MVP leaves a thing or two to be desired, but at $100 it's impossible to ignore.

For half the price of the c300, Media MVP streams still images and video in addition to music.

Hauppauge Media MVP

MAXIMUM PC VERDICT 8

FRENCH CUISINE

Music, pictures, and video playback over a network at a rock bottom price.

FRENCH FRIES

Lack of support for some common formats.

$100, www.hauppauge.com

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Blacksheep

Digital Media Systems

Q: What separates a $20,000 luxury home entertainment system from a $2,000 Blacksheep Digital Media System ?

A: $18,000 !

State of the Art Video Processor

- Watch TV, DVD (MPEG2), VCD (MPEG1), DivX (MPEG4), HDTV, Streaming Internet Video all with scaling and deinterlacing capability
- Watch, Record, Edit, and Create Video for archiving to a media library or DVD

World Class Audio Processor

- Play CD, DVD-Audio, MP3, OGG, WMA, and Internet Radio in stereo to 7.1 surround
- Create, Record, Edit, and Listen to Audio on portable MP3 players & create custom CDs

Top of the Line Computer

- Hyper-Threaded Intel Pentium P4, Advanced Intel 865 chipset with 800 MHz FSB, and 512MB to 1GB of RAM Standard
- Serve audio, video and pictures to computers, stereos and TVs over your home Network
- Play the most advanced, exciting computer games ever with ground-shaking sound and big screen or home theater projector output!

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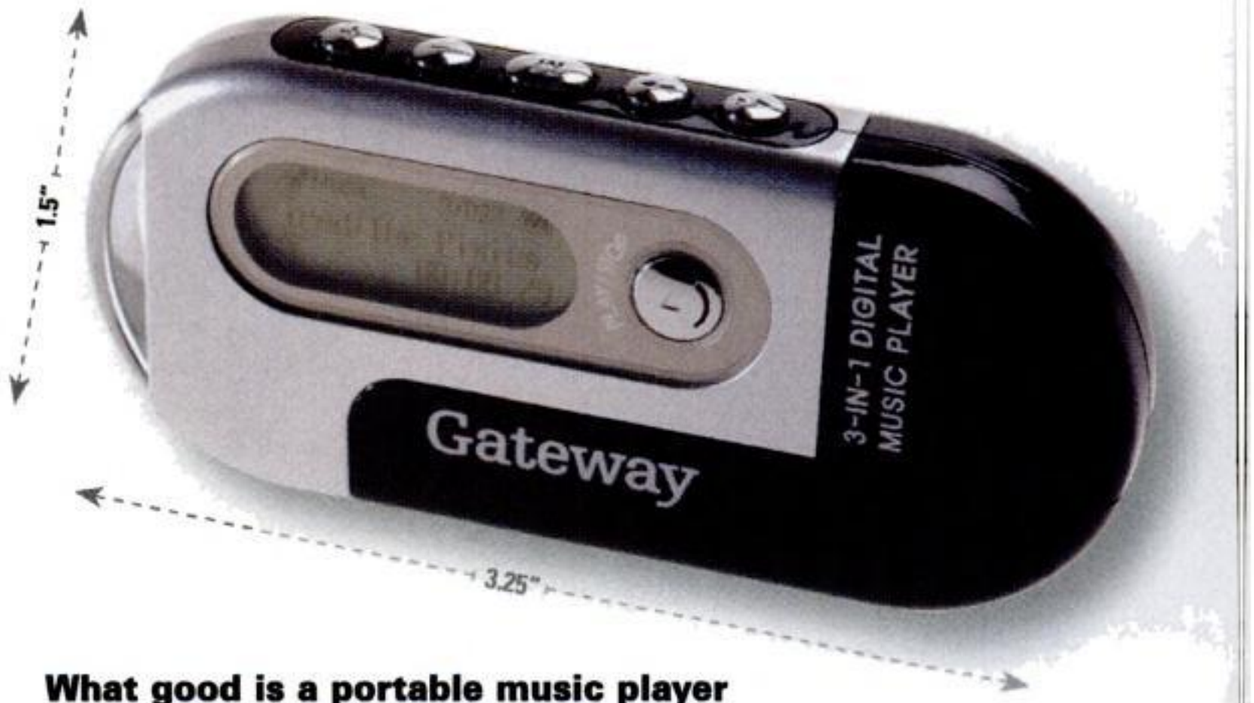
Gateway 256MB MP3 Player

The PC maker fares poorly in the moo-sic business



What good is a portable music player if you can't crank up the volume?

Gateway, the bovine-themed PC manufacturer, wants to establish itself as a company that knows how to party. Take, for instance, the company's new DMP-300—a solid-state MP3 player, data storage device, and voice recorder that packs 256MB of memory in a slim, 1.5-ounce package.

To be honest, we were a little disappointed that this MP3 player doesn't bear the distinctive cow spots that adorn Gateway's boxes; that would've been just goofy enough to wrap all the way around the cool continuum to become hip again. Instead, the DMP-300 simply says "Gateway" and offers a little loop at one end through which you're supposed to thread a carrying strap. Uh...no, we are not wearing this thing around our necks. No way. Lacking even an optional belt clip or armband, our only resort was to stick it in a pocket.

As usual, we dismissed the miserable bundled earbuds and replaced them with Shure's E2c earbuds to get a true idea of the sound output. The sound quality out of the box was a notch below that of Creative's comparable MuVo NX, but we were able to compensate by tweaking the sound via the DMP-300's 10-band graphic equalizer. This is a *very* nice touch, and a feature that even Apple's iPod lacks. Unfortunately, we still had issues—the volume never got loud enough. We didn't even wince at full volume, which was around 75 to 80 percent that of similar players. We're not asking for nosebleeds, mind you, but with some songs we like to crank up our music to almost deafening levels. If you're the same, this player isn't for you.

The DMP-300 connects via USB 1.1 to load music and data files, and plays MP3 and WMA files, but not OGG. Gateway includes a software app that converts audio recorded with the unit from its proprietary format to WAV files, but it lacks an MP3 encoder.

We dig the swank graphic equalizer and comfortable, rounded-edge design, but the DMP-300 is crippled by weak volume. If you gotta have the voice recorder, go for it—but you may want to consider headphones with amps.

—LOGAN DECKER

MAXIMUM PC VERDICT 6

MOO JUICE

The curvaceous design is a pleasure to hold, and the 10-band EQ rocks.

MOONIES

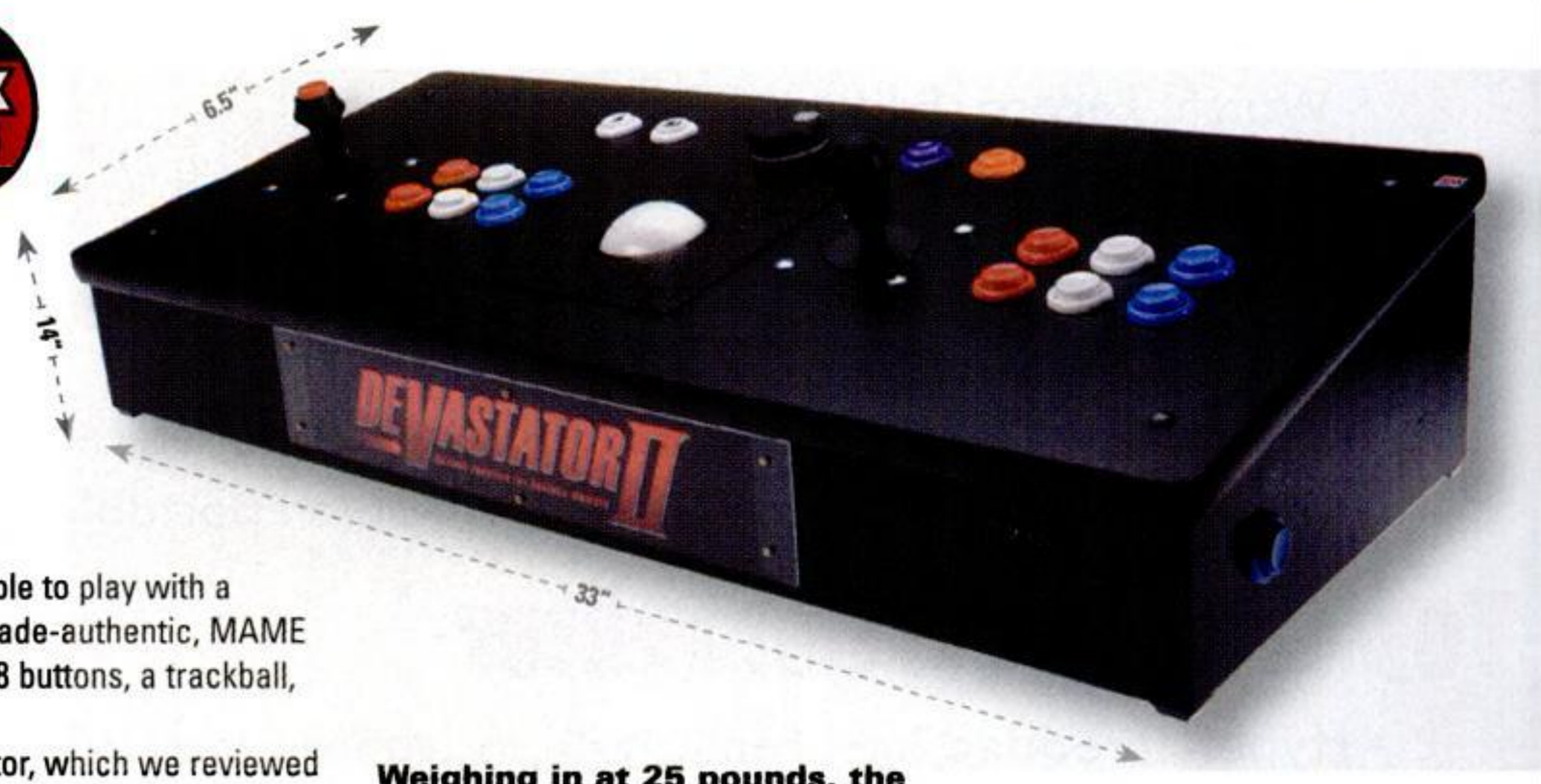
The DMP-300 simply doesn't get loud enough for our tastes.

$170, www.gateway.com

Treyonics Devastator II

MAXIMUM PC KICK ASS PRODUCT

Now old-school gaming feels exactly like we remember it



Weighing in at 25 pounds, the Devastator II opens the door to a world of classic gaming, from Ms. Pac-Man to Millipede.

Nothing, but nothing, beats a good game of Tempest. Sure, modern games look better, have actual stories, and are much more complex, but the best arcade games are more entertaining than the majority of today's story-driven schlock. The problem is that Tempest is nigh impossible to play with a mouse. Enter the Devastator II: A fully functional, arcade-authentic, MAME controller for your PC, complete with two joysticks, 18 buttons, a trackball, and a spinner .

We had some problems with the original Devastator, which we reviewed in the February 2002 issue. Its four-button layout severely limited the games we could play, and the spinner left a lot to be desired. The new Devastator II more than makes up for the transgressions of its predecessor. It includes a pair of eight-way joysticks with six buttons each (one even has a fire button), a trackball that perfectly replicates the slippery-smooth sensation of the Centipede device, and a spinner unlike any we've ever seen before—it's nearly frictionless and takes absolutely no effort to spin. Seriously. We gave the spinner a whirl, went to get a Coke, came back, opened the Coke, and had Tempest up and running before the apparatus ceased revolving.

The control layout is nearly perfect, allowing you to play just about any arcade game made in the last 35 years—on your PC! The Devastator was a godsend in every game we tested, although we occasionally had to make minor adjustments to trackball or spinner sensitivity. Its build is sturdy and should survive years of enthusiastic usage.

The only thing the Devastator lacks is an apparatus that converts one of the eight-way joysticks into a four-way stick. Eight-way sticks just don't work well with games that demand four-way precision, like old favorites Ms. Pac-Man and DigDug.

Configuration of the Devastator II is simple. Plug it into a convenient USB port, and it will automatically initialize as a second keyboard and mouse. The sticks and buttons are preset to the MAME defaults, so you'll be up and running in less time than it takes to clear a space on your desk. It's the perfect tool for any classic-gaming geek.

—WILL SMITH

MAXIMUM PC VERDICT 9

TEMPEST

This great-looking cabinet holds the power to play nearly every arcade game ever made.

TEMPEST 2000

The price is hefty at $400, but we can forgive that, given the included $100 trackball.

$400, www.treyonics.com

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I/OMagic 8x Dual-Format DVD Burner

The hokey-pokey—that's what it's all about

I/OMagic's DVD burner is about as exciting as David Blaine in a glass box.

THE BUNDLE

InterVideo WinDVD
Pinnacle Expression
Pinnacle Studio 8 SE
Pinnacle Instant CD/DVD SE

Writes to:	
DVD+R	8x
DVD-R	4x
CD-R	40x
Rewrites to:	
DVD+RW	4x
DVD-RW	2x
CD-RW	24x
Reads:	
DVD-ROM	12x
CD-ROM	40x

At $200 (MSRP), I/OMagic brings the price of burning your own DVDs to an all-time low. You might think such rock-bottom prices can only translate into lower performance. In this case, you'd be right.

At the time of this writing, there's still no officially spec'd 8x DVD media. Plextor deals with this awkward situation in its 8x approach by creating a burning scheme that allows high-quality 4x media to be burned at 8x throughout most of the disc, slowing down only at the beginning and end of the burn process. I/OMagic's approach also allows you to burn at 8x on 4x media from recommended manufacturers, but with far more modest results.

After experimenting with two different brands of DVD+R media recommended by the manufacturer, the best burn time we were able to coax from the I/OMagic burner was a paltry 13:32 (min:sec), which pales in comparison with the Plextor PX-708A's record of 8:11. Burning to CD-R didn't work much better, taking 5:41 to squirt a measly 700MB of data onto the disc. We observed the same sort of pack-mule performance in the other, slower-rated formats. The only category in which the I/OMagic stood shoulder-to-shoulder with the big boys was digital audio extraction, ripping 74 minutes to disc in only 3:24.

BENCHMARKS	DVD	CD
Average data transfer (MB/sec.)	8.8	4.4
Random/full-stroke seek (ms)	104/412	78/143
Audio extraction (min:sec)	-	3:24
Data DVD/CD burn (min:sec)	13:32 (DVD+R)	5:41
CPU utilization	13% (2x)	5% (8x)

** The data CD burn test uses the bundled applications to create a 700MB CD-R. The data DVD burn test uses the bundled applications to create a 4.25GB using DVD+R media. The audio-extraction test uses a commercially stamped 74 minute audio CD. All tests were performed using Verbatim media, except where noted.*

The burn speeds aren't all that give us pause about this drive. The drive tray wobbles when ejecting and retracting, and the first drive we tested had to be replaced because it experienced difficulties recognizing burned discs—even discs it had burned itself.

The bundled software includes video editing, DVD authoring, and disc mastering software from Pinnacle. We found these applications useful and stable, but not as easy to use as Roxio's *Easy CD Creator* suite. And the bundled software DVD player, InterVideo's *WinDVD 4*, is a full revision behind the latest version, *WinDVD 5*, which has been available for some time now.

You can find much better deals than I/OMagic's DVD burner, particularly if you're looking for an all-in-one combo drive. So why deny yourself the extra speed you can get from better contenders like Plextor, Lite-On, and TDK?

—LOGAN DECKER

MAXIMUM PC VERDICT 5

+ CORAL REEF
It's cheap. Really cheap.

– BRITISH TEETH
It's slow. Really slow.

$200, www.iomagic.com

Sound Blaster Audigy 2 ZS Platinum

Creative improves the best by a bit

In addition to the internal Live Drive! connector bay pictured here, the Audigy ZS Platinum also comes in an external formfactor.

After facing some minor 24-bit soundcard competition last summer (which has since all but fizzled out), Creative Labs could've easily settled into a simple holding pattern with its Sound Blaster Audigy 2, the company's top offering. But the recently released Audigy 2 ZS Platinum—while not a major upgrade—proves that Creative doesn't take its market dominance for granted.

For example, the Audigy 2 offered 6.1 speaker support while its main competitors could accommodate 7.1 setups. And although the Audigy 2 offered awesome audio when using DVD-Audio, M-Audio's Revolution 7.1 had slightly better sound quality. And the Audigy wasn't quite capable of producing 24-bit on all its seven channels. The Audigy 2 ZS corrects these shortcomings with support for eight-channel audio sets, full 24-bit/96kHz audio on all its channels, and improved audio.

The Audigy 2 ZS sports the same digital audio converters as its predecessor, but Creative says the signal-to-noise ratio has gone from 106dB to 108dB in its newer card. Creative attributes the higher SNR to a redesign of the PCB and its consequent cleaner sound. We tend to believe the claims as our subjective listening tests of 24-bit/96kHz material favored the Audigy 2 ZS's sound quality over that of the once-superior Revolution 7.1 card.

The Audigy 2 ZS allows you to manage additional satellites via an applet that lets you fine-tune the speakers while factoring in elements such as your head size. Also new: a tuning applet for proper THX support. In the hardware department, Creative now bundles the Platinum versions of its card with both black and white bezels, and the remote control has been redesigned.

Performance-wise, the Audigy 2 ZS continues to outperform non-DSP based cards such as the Revolution 7.1 in gaming frame-rate tests. Overall, Creative Labs has improved upon an already strong design. Sound Blaster Audigy or Audigy 2 owners needn't shell out for the update, but anyone still mired in the muddy waters of 16-bit audio would do well to buy the Audigy 2 ZS, and enter the 21st century.

—GORDON MAH UNG

MAXIMUM PC VERDICT 9

+ SIGNAL-TO-NOISE
Excellent sound, great software bundle, DVD-Audio support.

– NOISE-TO-SIGNAL
DVD-Audio lacks title support, not enough of an upgrade for Audigy 2 owners.

$400, www.creativelabs.com

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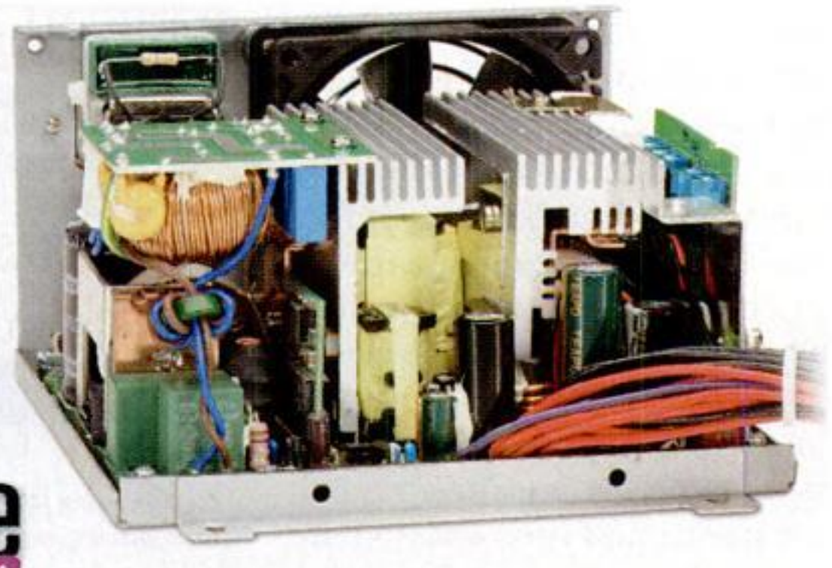

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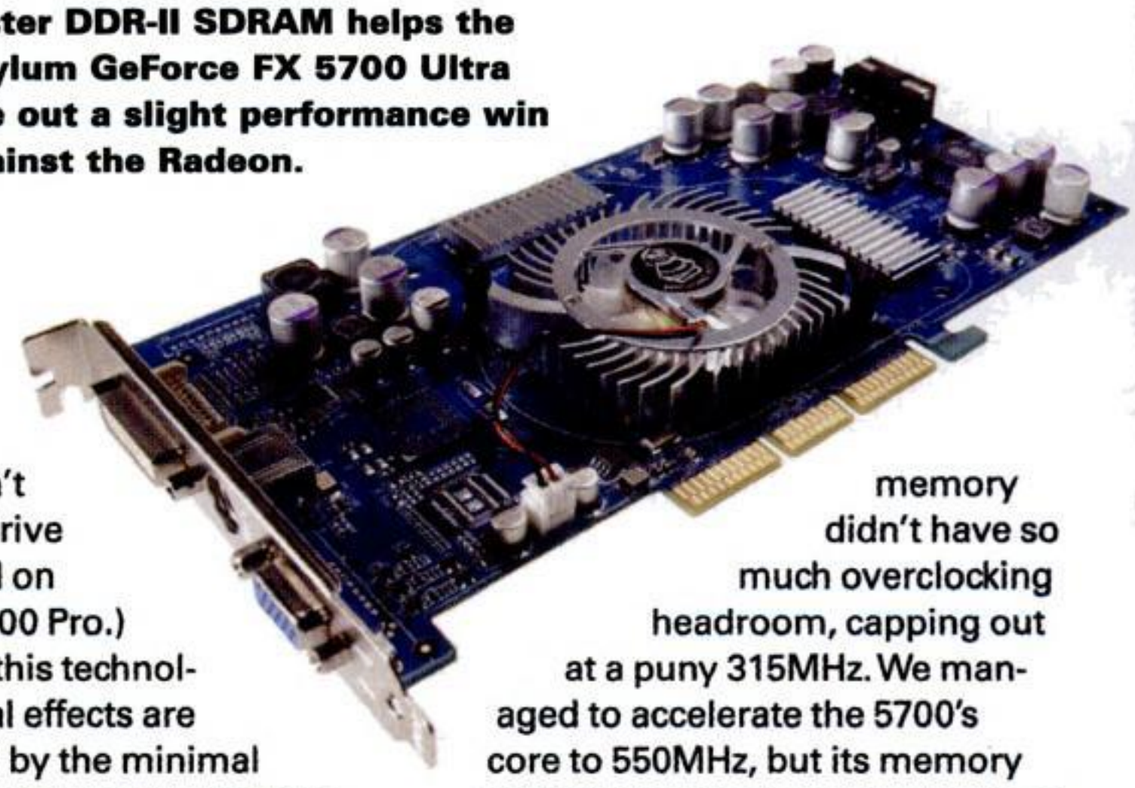
Budget 3D Card Bustup

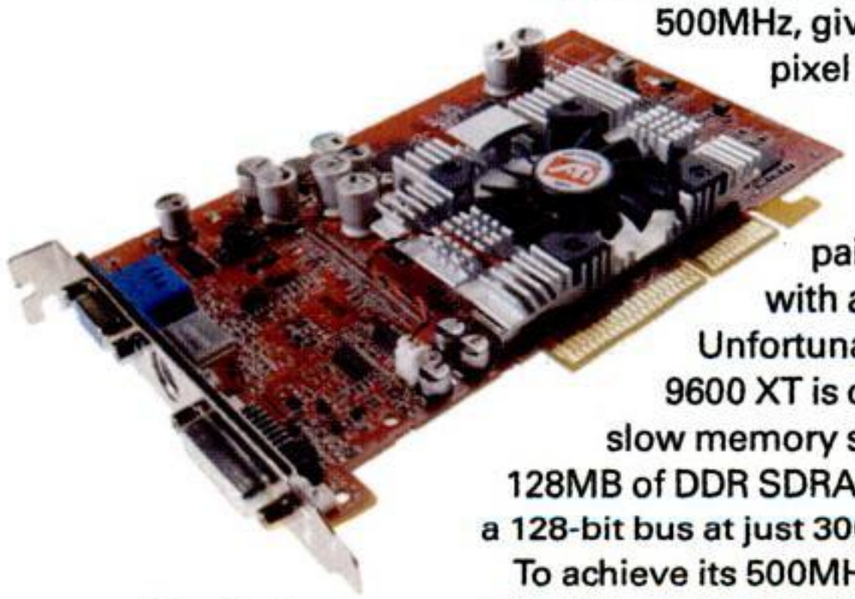
The time is right for fast, affordable 3D



Faster DDR-II SDRAM helps the Asylum GeForce FX 5700 Ultra eke out a slight performance win against the Radeon.

Not everyone has the bank to shell out $500 for a new videocard every six months. Fortunately, that's not necessary for decent performance in today's 3D games. The latest crop of $200 videocards posses more than enough power to play today's titles, and fast! We tested the ATI Radeon 9600 XT and the BFG Asylum GeForce FX 5700 Ultra to find out whether nVidia or ATI would win this round of the 3D wars.

The **ATI Radeon 9600 XT** is the next in a long line of mid-range programmable shader cards from ATI. Its core runs at a whopping 500MHz, giving its four pixel pipelines more than enough juice to paint polygons with aplomb. Unfortunately, the 9600 XT is crippled by slow memory speeds. It has 128MB of DDR SDRAM running on a 128-bit bus at just 300MHz.



The Radeon 9600 XT's shiny silver heatsink hides a 0.13-micron GPU that uses advanced low-capacitance insulators to reach stratospheric clock speeds.

To achieve its 500MHz core clock rate, ATI used a new type of low-k insulator on the GPU—fluorine-doped silicate glass, if you must know. This allows ATI to clock the core at a much higher speed without any additional cooling.

The Radeon 9600 XT also includes ATI's new Overdrive technology. If you missed our 9800 XT review last month, Overdrive monitors the GPU's core temperature and bumps up the core clock when the temperature is within certain parameters. (The 9600 XT measures the core temperature with a specifically placed thermal diode, so don't expect Overdrive to be enabled on your older 9600 Pro.) Realistically, this technology's practical effects are pretty limited by the minimal maximum clock bump to 527MHz.

Number two on our platter is the **BFG Asylum 5700 Ultra**. It's powered by nVidia's NV36 GPU, the company's first mid-range part that actually delivers decent performance in programmable shader games. Like the 9600 XT, the 5700 uses a 128-bit memory interface, but the 5700 sports 128MB of faster DDR-II memory running at 450MHz.

The GeForce FX 5700 GPU makes several performance-enhancing improvements to the 5600 line of cards. First and foremost, nVidia upped the number of programmable vertex units from one to three. Tripling the number of vertex units should remove vertex processing power as a potential bottleneck down the programmable pipeline. The 5700's programmable pixel units also received some performance tweakage, but nVidia has declined to make any specific claims about that area of the pipeline.

Despite the 5700 Ultra's memory-bandwidth advantage—14.4GB/sec compared with the 9600's 9.6GB/sec, the cards turned in almost identical benchmark scores. As is the case with the high-performance 5950 and 9800, both budget cards finish within five percent of each other in most benchmarks. In other words, benchmark scores alone don't reveal a clear winner.

In terms of overclocking, videocards in the $200 range have traditionally performed very well. To put these cards to the test, we fired up *Powerstrip* and upped the core and memory clocks on each card until we began to witness visual artifacts or other errors.

We were able to overclock the Radeon's core all the way to 580MHz without any noticeable effect to visual quality, but the card's memory didn't have so much overclocking headroom, capping out at a puny 315MHz. We managed to accelerate the 5700's core to 550MHz, but its memory couldn't handle clock speeds above about 480MHz. Keep in mind that it's impossible to judge an entire product line's overclocking potential from a single sample, so your overclocking mileage may vary.

THE VERDICT

There's not a whole lot separating these two cards. Both crank out almost identical performance numbers across the board. The Asylum 5700 is slightly faster than the 9600 XT, but for most of our tests, the difference is well within the margin of error.

The good news for consumers is that there's never been a better time to purchase a fully programmable videocard. Both of these are excellent performers, and will work well with current and future programmable shader games.

Ladies and gentlemen, this one's a draw.

—WILL SMITH

BENCHMARKS

	GeForce FX 5700 Ultra	Radeon 9600 XT
Halo 1.02	**15.24**	15.00
UT2003 Flyby	**81.1**	76.54
UT2003 Botmatch	**57.6**	56.7
Quake3 MPC	**108.7**	98.4
3DMark 2003 Game 2	**26.1**	23.4
3DMark 2003 Game 4.0	22.1	**23.6**
3DMark 2003 Overall	**3934**	3766

Best scores are bolded. All benchmarks were run on our 3.0GHz Pentium 4 videocard test bed. Tests are run at 1600x1200 in 32-bit color except for 3DMark 2003 tests, which are run at their default resolution. The Swahili word for hippopotamus is kiboko.

Radeon 9600 XT

MAXIMUM PC VERDICT 8

+ FORTUNE COOKIES

Great programmable shader performance for less than $200, and no external power requirement.

– FORTUNE TELLERS

The 128-bit memory interface and slow memory ultimately cripples this board's performance.

$200, www.ati.com

GeForce FX 5700

MAXIMUM PC VERDICT 8

+ VERSE SLINGING

Great performance, decent overclockability, and a quiet single fan.

– MUD SLINGING

It's not as fast as a top-of-the-line board, but it costs half what the GeForce FX 5950 does.

$200, www.ati.com

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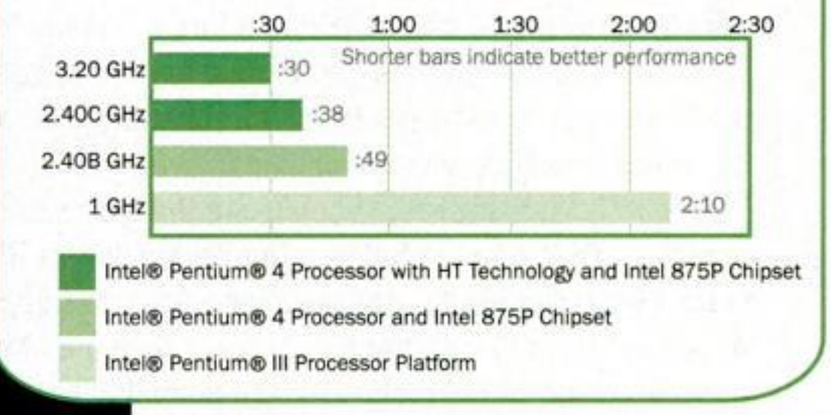
EN-BC3

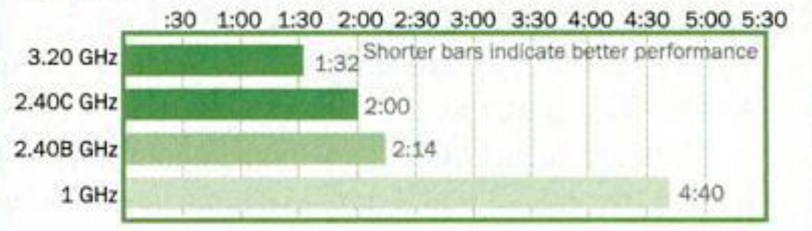
Multitasking - Digital Media

Magix* MP3 Maker* 2.39 Gold with XMPEG* 4.5 and DivX* 5.02
Measurement shows average task time in minutes and seconds



Multitasking - Gaming and Music

MusicMatch* Jukebox* 7.2 with Novalogic* Comanche* 4
Measurement shows average task time in minutes and seconds


:30 1:00 1:30 2:00 2:30 3:00 3:30 4:00 4:30 5:00 5:30
Shorter bars indicate better performance
3.20 GHz
1:32
2.40C GHz
2:00
2.40B GHz
2:14
1 GHz
4:40
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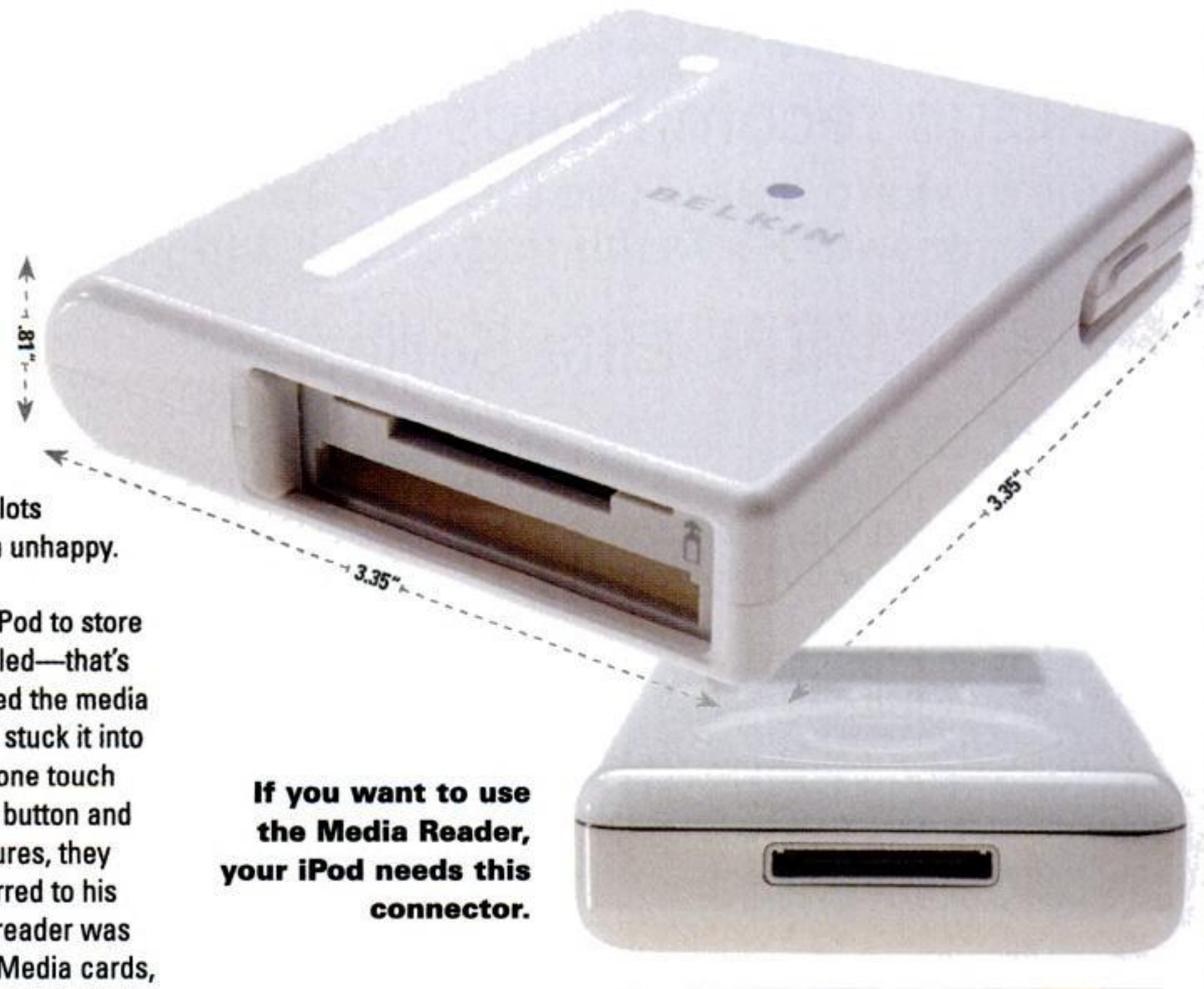
Belkin Media Reader for iPod

One way of dealing with the liberal media



If you want to use the Media Reader, your iPod needs this connector.

There was once a photographer. His name was Mark. He bought himself a 40GB, third-generation iPod. He liked to listen to music while taking pictures. It made him happy. But when he traveled to take pictures, he had to carry lots and lots of memory cards so as not to run out of storage. That made him unhappy. Those darn media cards are so expensive!

"If only," Mark mused, "I could use the empty space on my iPod to store pictures." Then he saw Belkin's Media Reader for iPod and smiled—that's exactly what the Media Reader allowed him to do! He connected the media reader to his iPod, took the full memory card out of his camera, stuck it into the reader, and all his pictures were uploaded to the iPod with one touch of a button. Then he erased the card with one touch of another button and stuck it back into his camera. Every time he uploaded new pictures, they appeared as individual "rolls" on his iPod that could be transferred to his computer at home through Windows Explorer. Even better, the reader was able to accept his CompactFlash, his Memory Sticks, his SmartMedia cards, and his SD cards, too.

Mark would've been a very happy photographer if not for a few niggling issues. He noticed that it took 15:08 (that's in minutes and seconds) to load 303MB of photos and movies from his digital camera onto the iPod. The media reader at home took just 6:24 to do the same thing. *Drat.*

Mark was also vexed that the reader didn't have a USB or FireWire connector, so it couldn't be used directly with his PC. Plus, the reader would work only with his third-generation iPod—the one with the big, funny dock connector on the bottom. It also seemed to Mark that the reader was very big. *Pooh.*

Oh well. It was still cheaper than buying one of those hard-drive-in-a-box "digital wallets." Mark hopes that the next version will be smaller, have connectors for off-hours use with a PC, and be *much* faster. So do we.

—LOGAN DECKER

MAXIMUM PC VERDICT 7

+ DIGITAL CAMERAS

Belkin's Media Reader is an extremely clever way to make the most of all that space on your iPod.

– RED LIGHT CAMERAS

It's too slow, can't be used as a PC media reader, and is much bigger than it needs to be.

$110, www.belkin.com

WIN Rig of the Month and Win Big!

If your modded PC is chosen as a Rig of the Month, it will (1) be featured before all the world in *Maximum PC*, and (2) win you $1,000 and a case of BAWLS high-caffeine soft drink. So what's stopping you?

TO ENTER: Your submission packet must contain your name, street address, and daytime phone number; no fewer than three high-res JPEGs (minimum size 1024x768) of your modified PC; and a 300-word description of what your PC represents and how it was modified. E-mailed submissions should be sent to **rig@maximumpc.com.** Snail mail submissions should be sent to Rig of the Month, c/o Maximum PC, 150 North Hill Drive, Suite 40, Brisbane, CA, 94005.

The judges will be Maximum PC editors, and they will base their decision on the following criteria: creativity and craftsmanship.

One entry per household.

Your contest entry will be valid until (1) six months after its submission or (2) May 1, 2004, whichever date is earlier. Each month a winner will be chosen from the existing pool of valid entries, and featured in the Rig of the Month department of the magazine. The final winner in this contest will be announced in the July 2004 issue. Each of the judging criteria (creativity and craftsmanship) will be weighed equally at 50 percent. By entering this contest you agree that Future Network USA, Inc. may use your name, likeness, and web site for promotional purposes without further payment. All prizes will be awarded and no minimum number of entries is required. Prizes won by minors will be awarded to their parents or legal guardians. Future Network USA is not responsible for damages or expenses that the winners might incur as a result of the Contest or the receipt of a prize, and winners are responsible for income taxes based on the value of the prize received. A list of winners may also be obtained by sending a stamped, self-addressed envelope to Future Network USA, Inc., c/o Rig of the Month, 150 North Hill Drive, Brisbane, CA 94005. This contest is limited to residents of the United States. No purchase necessary; void in Arizona, Maryland, Vermont, Puerto Rico, and where prohibited by law.

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Logitech Z-5300

A whole lotta 5.1 speaker boom for the buck

The star of the Z-5300 show is the 100-watt, double-flared sub, which pounds away at your chest like an EMT working on a KFC-overdose victim.

We've always been purveyors of pure PC power, but even *Maximum PC* understands there are times when one must adhere to a budget. We're reminded of this situation every two weeks, in fact. Logitech must also be aware of this unfortunate reality, because the company has released a brand-new 5.1 system that caters to folks with Cristal wishes but Keystone Lite pocketbooks.

Taking up the slot right below the company's eardrum-splitting Z-680 speaker rig is Logitech's Z-5300—a midrange 5.1 system built for playing games and MP3s. The system boasts THX certification, 280-watt RMS, a wired remote, and a 6.5-inch double-flared ported sub.

Apparently Logitech hired Ikea engineers to design the speakers' installation process because it's practically moron-proof. We're talking Mac-user friendly here. Each speaker is labeled ("rear right," for example) and has a colored RCA connector that corresponds with its mate on the back of the sub. The only problem with this approach is that the speaker wire is hardwired to the satellites and terminates in an RCA jack, so adding extra cable to a speaker wire will involve splicing RCA cables together rather than traditional speaker wire. The rear speaker cables are 14-feet long, which might be fine for a desktop environment but probably too short for a living room situation.

Once connected to your PC via its three analog jacks (no digital decoder or digital-out), the Z-5300 set offers surprisingly good sound quality. The crossover from the sub to the satellites was fairly evident in our 20Hz to 22kHz sweep. And the satellites crackled on high-pitched female vocals when the volume was cranked up, but that's to be expected from tweeterless sats. The speakers produced clear tones at reasonable volumes. The sub also belched a bit during the pink-noise test, but handled everything we threw at it during "real world" testing of games and MP3s, producing surprisingly deep, tight bass.

Although this system doesn't boast crystal-clear fidelity or a digital decoder, it's still the best $200 5.1 system we've ever heard. And we *love* the swiveling base on the satellites, which allows them to sit on a desktop or be mounted on a wall.

—JOSH NOREM

MAXIMUM PC VERDICT 8

+ SIGNAL-TO-NOISE

Above-average sound, thumping bass, cool sat design.

– NOISE-TO-SIGNAL

Nonstandard speaker wires, no digital decoder, no tweeters.

$200, www.logitech.com

Logitech Cordless Desktop MX for Bluetooth

Wireless freedom for your mouse, keyboard, and anything else

The Cordless Desktop MX's stylish charcoal-and-silver design will catch your eye, but it's fully operational Bluetooth stack will capture your heart.

Last month we reviewed Microsoft's unremarkable Wireless Optical Desktop Elite. This month we tested the new Logitech Desktop MX for Bluetooth. At first glance, this package seems indistinguishable from Microsoft's offering, but it actually offers a power user much more functionality.

Instead of using a proprietary wireless protocol to communicate with the mouse and keyboard, Logitech's devices use a fully featured Bluetooth stack. In addition to the profiles that make the mouse and keyboard work, the Desktop MX includes a host of other official Bluetooth profiles. This means you can use the included stack to connect your cell phone, PDA, and even Bluetooth headset to your PC—wirelessly!

The mouse and keyboard are similar to two existing Logitech products: the MX700 wireless gaming mouse—a *Maximum PC* favorite since 2002—and last year's Elite keyboard. The likenesses are more than external. The mouse uses the same 800dpi optical sensor, which transmits movement information fast enough for even demanding gamers. The keyboard includes 13 user-configurable hotkeys, a volume knob, a scroll wheel, and the same "improved" function keys that annoyed us last year.

If you're unfamiliar with the keyboard's offending feature, know this: The F1 through F12 keys have been remapped to common Windows tasks, such as opening new documents and printing. To reclaim the traditional functionality of the F-keys, you need to press the F-Lock key. This would be a great feature, except that many motherboards require you to press F1 or F2 to get into the BIOS. With today's fast-booting BIOSes, you have approximately 1/10 of a second to press the F-Lock key and then press the key to enter your BIOS before the window of opportunity closes. This could've easily been avoided had Logitech left the F-keys at their default behavior and required a user to press F-Lock for the remapped Windows tasks.

The mouse sports rechargeable batteries, but the keyboard uses four standard AA batteries. Battery life on the mouse isn't as good as with the MX700, but a single charge will last at least two days.

We'd say Logitech has a wireless winner on its hands with the Cordless Desktop MX for Bluetooth.

—WILL SMITH

MAXIMUM PC VERDICT 9

+ WAYLON SMITHERS

A solid-performing mouse and keyboard tempt us, but the Bluetooth adapter seals the deal.

– OLD MAN WINTERS

The new "improved" F-keys still annoy the hell out of us. Change is bad!

$180, www.logitech.com

Protected material

Startech Aluminator

How badly do you want a motorized case door?

Call us lazy, but we Americans love all things powered. Powered windows, powered seats, powered garage doors, powered armies of small, ferocious robot ants that will someday allow *Maximum PC* to conquer the entire world... In every aspect of our daily lives, we are able to avoid the slightest hint of physical exertion with a button and a motor. It is therefore no surprise to us that Startech thought to include a motorized door on its Aluminator case.

On paper, and from afar, the Aluminator appears to be a cool product. In addition to the motorized door, the case boasts a respectable load-out of features. It has a backlit LCD that displays time, power, hard disk activity, and temperature. Four 5.25-inch and one 3.5-inch front-accessible bays, one floppy bay, and four internal 3.5-inch bays, offer parking space aplenty for your drives.

Mountings for four case fans amply meet the cooling needs of all but the most insane overclockers, a decorated side window shows off the system's innards, and a front mounted I/O cluster includes USB, FireWire, and audio connectors. The bundled power supply unit even boasts a decent 400-watt rating.

Sounds good, right? Unfortunately, this case doesn't stand up to closer inspection. You would think, from its name and its $240 list price, that the Aluminator is made entirely of aluminum. For the most part it is, but the entire front bezel is plastic—the cheap, silvery-grey plastic found on $20 boom boxes that doesn't appear metallic at all and produces an audible creaking when prodded.

Many aspects of the design, from the break-away PCI slot covers to the flimsy plastic door hiding the front I/O ports, scream out Startech's cost-cutting measures. Furthermore, the LCD displays an inaccurate temperature reading for a few seconds after you switch between Celsius and Fahrenheit. None of these flaws are critical, but they are not the makings of a premium product.

With its motorized door, backlit LCD, and decorative window, we really wanted to like the Aluminator.

Admittedly, or thankfully, the Aluminator's street price will probably be about $80 less than Startech's exorbitant suggested retail price. Nonetheless, with quality cases like Cooler Master's Wave Master selling for roughly the same price, you should ask yourself how badly you want a motorized door before shelling out the dough for this case.

— DWIGHT LOOI

MAXIMUM PC VERDICT 6

LEXUS
Motorized door, ample internal room, power supply included.

YUGO
Tacky construction, overpriced.

$239 ($160 street), www.startech.com

Silver Stone SST-LC01

The return of the case king... well, kind of

When Cooler Master drastically trimmed its product line in the fall of 2002, it put all its desktop cases on the chopping block. While unloved by performance junkies, these desktop offerings were sorely missed by system builders seeking an alternative to stoically upright tower enclosures. Thankfully Silver Stone Technologies now offers a worthy replacement to those forsaken Cooler Master cases: the Silver Stone SST-LC01.

Don't let appearances fool you. This is not an Silicon Graphics box, although one could argue that the case's aesthetic pays homage to the fading icon of high-performance computing. Truth be told, we strongly suspect this case of being a Cooler Master ATC-610C enclosure with a facelift. Like the Cooler Master model, the SST-LC01 features all-aluminum construction, and offers the same complement of drive bays: two 5.25-inch and two 3.5-inch front-accessible bays, along with four internal 3.25-inch bays. The front-accessible drives are hidden behind a pair of soft-release aluminum doors that dominate the front fascia, as are the front USB, FireWire, and audio connectors. A sturdy crossbar inside the case gives it strength enough to hold the weight of a hefty monitor or mini-fridge without buckling. Unlike most desktop cases, the SST-LC01 will easily swallow a full ATX mobo and all its seven expansion slots.

The overall quality of this case is good, but like many desktop enclosures, it may be less than ideally suited for speed. The presence of a single 80mm fan is the first sign; granted, a power supply fan will aid ventilation, but airflow will still be marginal at best. Another sign of speed unworthiness is the imprudent placement of two air inlets on the sides of the case, which guarantees that none of the drives will catch a cool breeze. We also found that a long videocard like the nVidia FX 5900 Ultra has to compete for space with the drive in the neighboring bay.

Finally, a desktop case that will help us get over the death of Cooler Master's offering.

Nonetheless, as long as you steer clear of hot-running hard drives and remain mindful of space issues, the SST-LC01 will serve you adequately.

— DWIGHT LOOI

MAXIMUM PC VERDICT 7

SGI
SGI look, solid construction, good build quality, full ATX accommodations.

SDI
SGI look, mediocre ventilation, possible space limitations.

$163, silverstonetek.com

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Two Loc'd Out Routers Routers Goin' Crazy

G-spec'd wireless routers make strides

She's not the prettiest 802.11g router at the prom, but she's definitely the fastest!

We reviewed the first round of 802.11g Wi-Fi routers early last year, before the G spec was even finalized, and found ourselves sorely disappointed. Those fancy, newfangled first-generation routers wouldn't transfer data at speeds anywhere near the 54Mb/s afforded by the 802.11g spec, capping out at measly 802.11b speeds whenever 802.11b devices came around.

The D-Link AirPlus XtremeG and the Microsoft Base Station MN-700 rectify many of the early units' problems, but they're not perfect.

—WILL SMITH

D-Link's AirPlus XtremeG

On the surface, the XtremeG includes all the features we covet in a wireless router: full 128-bit WEP security, support for the new WPA security standard, a rudimentary firewall, NAT support, and myriad other security options, including a stealth mode that can hide its very existence from Internet evil-doers. The XtremeG also sports four wired Ethernet ports for all your tethered machines.

Installation for the XtremeG is easy, even for novices. The documentation covers setup options for nearly every network configuration we could imagine. We configured the router by connecting it to a PC with a simple Ethernet cable. Once the router doled out an IP address to our wired PC, we were able to use the web-based configurator's easy setup wizard to tune the router's settings. While the wizard didn't go so far as to suggest we change the default SSID, it did give us the option to adjust the SSID, WEP, or WPA settings.

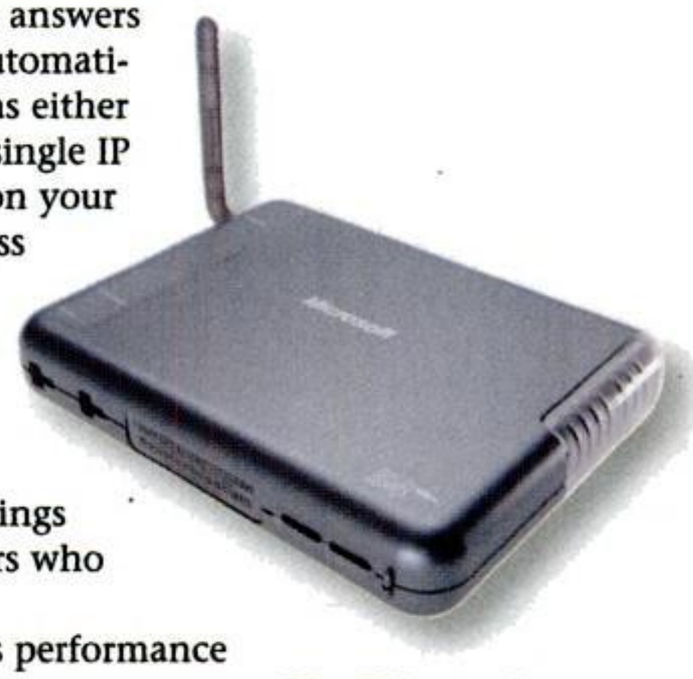
The XtremeG includes a bonus feature that uses two channels to double the available bandwidth for wireless clients connecting to the router. Unfortunately, this feature only works with D-Link products. We measured fantastic download speeds using the 108Mb/s mode, and the XtremeG was able to download our 533MB test file in 3 minutes, 18 seconds; more than twice as fast as the standard 802.11g mode. Oddly, uploads were only slightly faster using the enhanced mode.

Or only complaint is that there's no immediately obvious way to disable the XtremeG's router functionality so that it can simply serve as a standard access point. You can get AP functionality by disabling DHCP and connecting one of the hub ports (instead of the WAN port) directly to your LAN, but this isn't well-documented. Granted, most people who purchase a Wi-Fi router will want to use it as a router, but home network topologies occasionally change, and there's no reason a wireless router shouldn't be able to serve as an access point as well.

Microsoft Base Station MN-700

The MN-700 has many of the same basic features as the XtremeG, but doesn't stray as far from the G spec as D-Link's router. What really sets the MN-700 apart is the exceedingly simple configuration routine.

Unlike some other "easy" configuration routines, which leave your network as vulnerable as Ashton Kutcher's career, Microsoft's setup suggests you change the SSID and enable WEP or WPA security. The router then asks you several simple questions that allow it to mesh properly with your home network. Based on the answers you give, the router automatically configures itself as either a router that shares a single IP with every computer on your network, or as an access point that serves only as an interface between the wired and wireless network. It will even configure persnickety PPPoE settings for pesky DSL providers who require them.



The Microsoft 802.11g offering is great looking and easy to configure.

Sadly, the MN-700's performance was disappointing. In the compatibility mode, it frequently slowed to 802.11b speeds when 802.11b devices were around, bringing all the PCs on our wireless LAN down to 11Mbit/s throughput. Once we set the router to 802.11g-only mode, performance improved significantly, but the Microsoft router still couldn't compete with the D-Link's default performance. We definitely wouldn't recommend this router to someone who needs high-speed 802.11g performance in a mixed environment.

If you find yourself waiting on file transfers across your wireless LAN, or you'd like to stream music or video across a wireless connection, now is the time to buy 802.11g wireless products.

DARE TO COMPARE

	AIRPLUS XTREME G	BASE STATION MN-700
Desktop to laptop	6:57 (min:sec)	9:31 (min:sec)
Laptop to desktop	5:49 (min:sec)	6:14 (min:sec)

To test router performance, we transfer a 533MB file from a wired desktop PC to a wireless laptop PC, and then back to the wired machine. All tests were run in the 802.11g-exclusive mode. There will be no hippopotamus trivia here.

D-Link AirPlus XtremeG

MAXIMUM PC VERDICT 9

CHECKING OUT

Lightning-fast file transfers are capable with this outstanding 802.11g router.

CHECKING IN

Understandably, the fastest 108Mb/s mode works only with other D-Link products.

$110, www.dlink.com

Microsoft MN-700

MAXIMUM PC VERDICT 8

PERSONAL DIGITAL ASSISTANTS

So simple to configure, even your grandmother can do it. Seriously.

PUBLIC DISPLAYS OF AFFECTION

Poor operation in mixed mode means that this router works best in 802.11g-only environments.

$100, www.microsoft.com

It's the Little Things...

Wee devices that add extra ports and enable wireless printing

D-Link USB 2.0/FireWire Combo Hub

OK, so it's not as sleek and sexy as the Belkin hub reviewed next door. But in a little box about the size of a bar of soap, D-Link piles on four USB 2.0 ports and two FireWire ports. The package includes the USB and FireWire cables you need to take those ports from the back to the front of your PC, where they belong. Cheerful green lights indicate when the hub is powered up and the ports are active. And not only is the power supply light and unobtrusive, it actually says "D-Link" on it. (Frankly, we think there should be a law requiring power supplies to be labeled with the name of the product they come with.)

The minimum we ask of a decent hub is that it be able to manage all active ports without imposing bandwidth restrictions (beyond what the bus can transfer, of course), a test that D-Link's hub easily passes. Our biggest reservation, and it's fairly minor, is that the whole unit is so light that it skitters nervously around the desk at the slightest tug of a cord. The perfect hub would have a heavy, skid-resistant base, and include one more of each port than this model has. But we're perfectly happy with this unit, and, by golly, you will be too.

—LOGAN DECKER

⊕ **EASTER SEALS:** Includes FireWire and USB 2.0 ports in a small package.
⊖ **CLUBBING SEALS:** So light it's easily yanked around a desk.

MAXIMUM PC VERDICT: 9

$60, www.dlink.com

Belkin Hi-Speed USB 2.0 7-Port Hub

Here at the beginning of the 21st century, we've witnessed the creation of a 7-qubit quantum computer, an "optical" processor that can perform eight trillion operations per second, and neural interfaces that amplify brain waves to manipulate PCs. While this is all very exciting, we'd like to respectfully request that someone look into the challenging task of placing USB ports on the top of our PCs, or at least in the front. No, not one or two. Lots of them. Until some Einstein figures it out, here's a handy workaround. Underneath an almost rubbery-smooth grey finish, Belkin's seven-port USB hub provides you with five USB ports in the rump for your keyboard, mouse, and whatnot. The real kicker, though, is the two ports mounted on top for items that get plugged and unplugged frequently, like USB keys, MP3 players, or maybe even Kensington's FlyFan. Each port has a tiny light that indicates when it's working. That's not a wildly useful feature, but at least the lights are unobtrusive and don't blink during transfers—the OS already gives us the feedback we need on that.

Sixty bucks is a little steep for a hub that doesn't include FireWire, and the power supply is colossal. But these kvetches don't bother us nearly as much as not having convenient access to our USB ports.

—LOGAN DECKER

⊕ **PUB:** Convenience *and* glamour in a USB hub.
⊖ **SNUB:** No FireWire ports and the power supply is humungous.

MAXIMUM PC VERDICT: 7

$60, www.belkin.com

Ambicom Wireless Print Kit

Bluetooth's original mission—eliminating short wire runs between a PDA or printer and your computer—has been lost amidst a five year landslide of hype that has distorted its singular purpose into a cure-all for every form of PC pain and suffering. AmbiCom's Wireless Print Kit gets back on message with an amazingly simple feature: It's nothing more than a USB cable that uses Bluetooth.

True to Ambicom's packaging promise, we found installation of the Print Kit a snap. Just unplug your USB cable, plug in the Wireless Print Kit modules and move your printer up to 100 feet away. There's no software to install and no print server to configure. Although the Bluetooth modules won't let you communicate with other Bluetooth devices, you can supposedly run up to 30 slaves off a single printer. Communications are encrypted to keep your data safe.

We were disappointed that the kit kept connecting and reconnecting every five minutes. We couldn't pinpoint the cause, but considering the short ranges we were using in the lab, interference seems unlikely. We also hit serious speed issues with printers that saturate the 340Kbps data rate. Other printers performed acceptably.

—GORDON MAH UNG

⊕ **SMELL THE ROSES:** OS agnostic and doesn't require any drivers.
⊖ **GUNS AND ROSES:** Slow data throughput and random disconnects.

MAXIMUM PC VERDICT: 7

$69, www.ambico.com

D-Link DP-311U Wireless Print Server

If Ambicom's USB-based Wireless Print Kit seems a little too much like stringing Dixie cups together, you'll want to check out D-Link's DP-311U 802.11b wireless print server. Instead of relying on simple USB dongles, this is a full-on wireless or wired print server in a box **that allows you to move your USB printer** anywhere within range of your Wi-Fi network.

Setting up the DP-311U is mostly easy, although D-Link neglects to **mention that you should use a crossover** Ethernet cable to initially program **the unit. Once you're past that hurdle** though, D-Link's documentation is **crisp and clear—we had our print server** operating in just a few minutes. **We expected this server's 802.11b speeds to** offer better performance than **the Ambicom USB dongles when paired with our** Canon i9100, but the DP-**311U was just marginally faster. Like the Ambicom, the** D-Link device is fine **for low-speed inkjets printers and most laser printers, but you should definitely check D-Link's list of** approved printers before you buy the device.

Alas, we'd hoped to find the ultimate solution to moving our big-ass printer off the desk but we're still searching.

—GORDON MAH UNG

⊕ **ABSOLUT:** Snap to set up and works with most printers.
⊖ **MR. BOSTON:** Slow speed on some printers, doesn't send toner level info.

MAXIMUM PC VERDICT: 8

$145 street, www.dlink.com

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intel

- Intel Pentium 4 CPU 3.0 GHz 800MHz Part#: 3.0_800BX

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- iPAQ h1935 Pocket PC Part#: SYN-980410

LINKSYS A Division of Cisco Systems, Inc.

- Linksys Wireless G Access Point Part#: LS-WAP54G

D-Link

- D-Link AirPlus Enhanced 2.4GHz Wireless Router Part#: DL-DI714P

MSI

- MSI K8T Neo-FIS2R Socket 754/Athlon 64 Motherboard Part#: MB-K8TNEO

Kingston TECHNOLOGY

- Kingston 256MB DDR400HyperX Memory Part#: D400HX256K

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- Canon PowerShot s400 Digital Camera Part#: Canon-S400

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SONY

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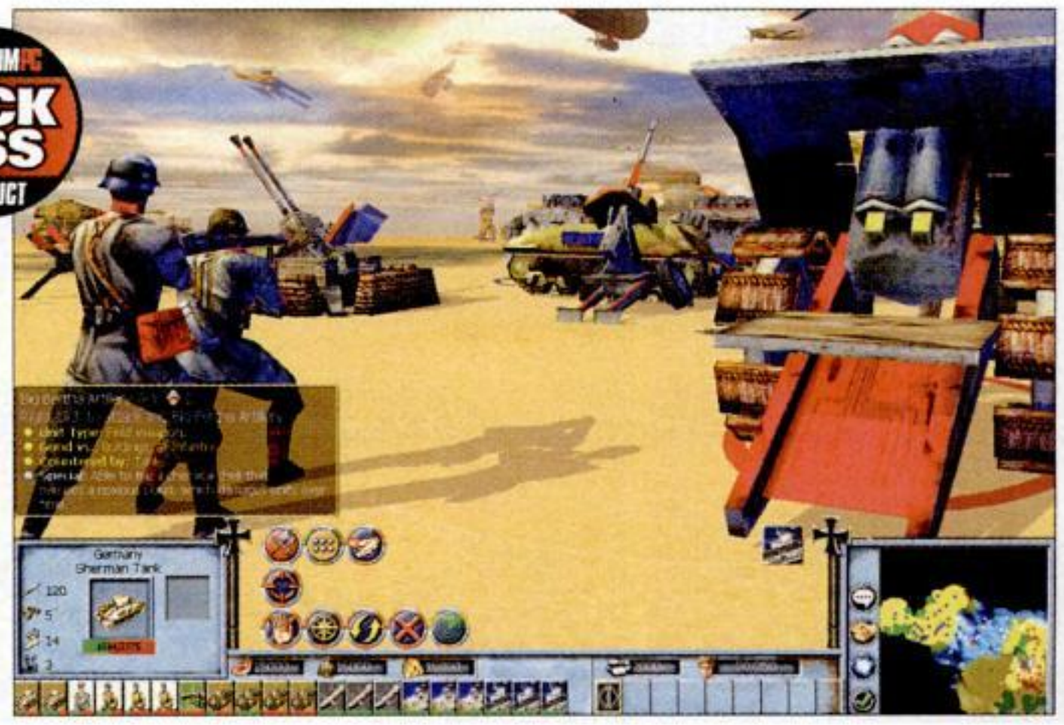
Empires: Dawn of the Modern World

May be the perfect *Age of Empires* follow-up



Empires' next-generation engine looks fantastic and allows extreme close-ups, but the fact that each of the seven civilizations feels unique really got us hot and bothered.

Empires: Dawn of the Modern World continues the fascinating refinement of a genre that leapt to life with the entertaining-but-flawed *Age of Empires* and has gradually, subtly redefined real-time strategy gaming. *Age of Empires* was the first game to attempt to graft *Civilization*-style empire-building onto the faster-paced conventions of RTS action, but the two styles have never quite meshed. Each requires a different approach in terms of pacing and play mechanics, and the increasingly epic sprawl of empire-building often resulted in civilizations that looked, felt, and played similarly.

Activision's *Empires* solves this problem elegantly with two distinct play modes. An "Action" mode kick-starts the combat early and uses weakened defensive structures that discourage protracted build-ups and tech-tree climbing. The result is a skirmish that lasts about 30 minutes—perfect for multiplayer gaming. "Empire-builder" games, on the other hand, encourage players to dig in for the long haul and gradually develop their civilizations into global powers.

We like that *Empires* reduces the half-million year sprawl of *Empire Earth* to a more manageable, more interesting 1,000 years—from the Middle Ages to World War II—which results in more distinct empires than most real-time strategy games possess. While the same unit categories (infantry, cavalry, aircraft, naval, and siege engines) can be found across all nations, the particulars of each civilization's units vary greatly, adding some much-needed strategic diversity to the game's five ages: Medieval, Gunpowder, Imperial, WWI, and WWII.

Strangely, this meat-n-taters nation-building is absent in the three heavily scripted single-player campaigns, which make extensive use of cutscenes and tightly formatted missions to tell the stories of Richard Lionheart, the defense of 16th Century Korea, and General Patton's WWII campaigns. We were interested in these events from a historical perspective, but felt frustrated by the rigidly limited access to units and technology. Skirmish and random map modes (and a great editor) make up for this, but the lack of stand-alone historical scenarios is disappointing.

Still, the amazing visuals and carefully balanced gameplay make *Empires* the most rewarding game from AOE designer Rick Goodman, and for fans that says it all.

—THOMAS L. MCDONALD

MAXIMUM PC VERDICT 9

+ EMPIRE EARTH

Two different play modes, truly distinct civilizations, and amazing graphics.

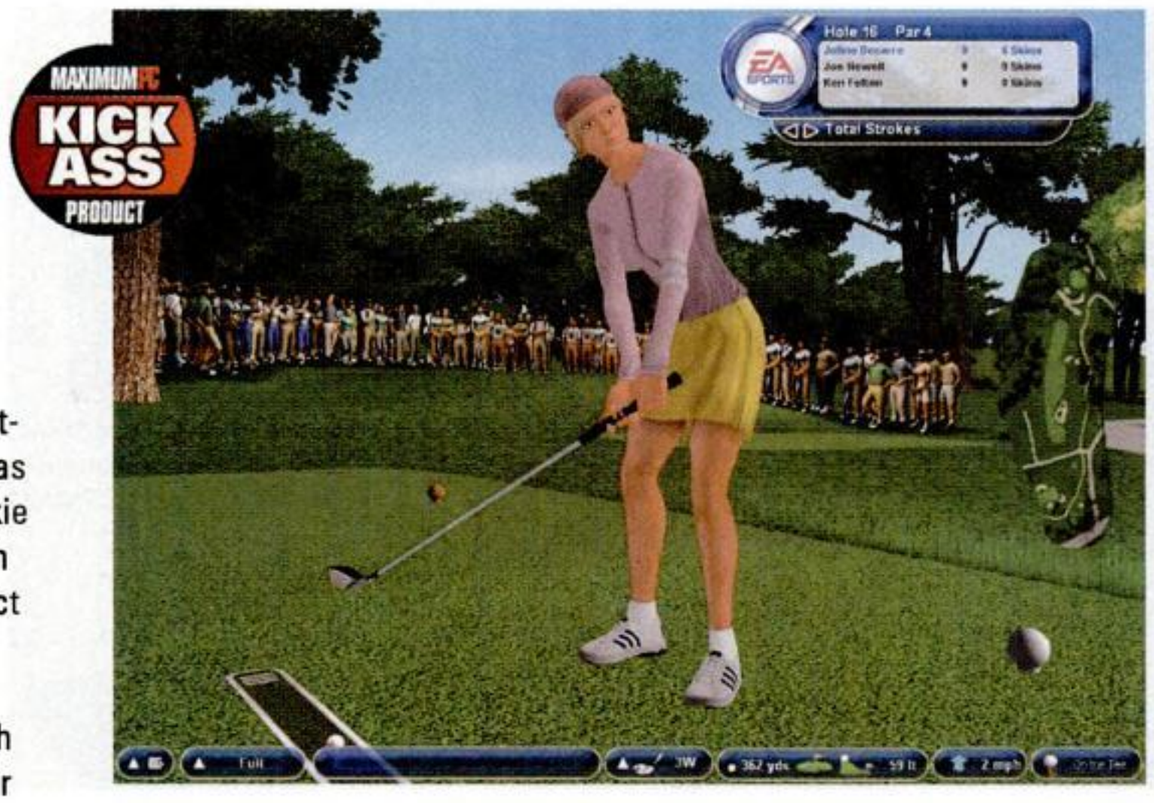
– BATTLEFIELD EARTH

Camera control could be more flexible.

$50, www.empiresrts.com

Tiger Woods PGA Tour 2004

Who needs Nancy Lopez when you can have Joline Decarre?



Joline Decarre is taking the golf world by storm. We credit her incredible short game—and short skirts.

Ladies and gentlemen, we proudly present Joline Decarre, the most fetching golfing phenom to ever play on the pro tour. With a coquettish sass that you just won't find in the frosty LPGA, Miss Decarre has been positively *owning* the fairways this year. Is it appropriate for a rookie to preen for the cameras like a swimsuit model after nailing an approach shot? We don't know, and we don't care. For we have created the perfect woman, and her name is Joline Decarre!

EA Sports has created the closest thing to a perfect golf game in the latest *Tiger Woods*. Let's start with EA's new "Game Face" system, which helped us give form to the coy Miss Decarre. As soon as you pick Career mode, you're invited to create your own golfer, who you'll enter into a wide variety of addictive, money-making events. Not only can you fine-tune your golfer's physical attributes, you can also outfit him or her with a dizzying array of outfits and equipment. We opted to style Joline as sort of a surfer-skater "Roxy Girl," and as luck would have it, the sassy celebratory animations used in the game perfectly fit Jo's image. In fact, all of the game's fine details—from the funny announcer commentary to bumble bees buzzing by the camera—amount to an incredibly rich experience. The 2004 version of the game also includes the largest number of courses that EA has ever provided—each one a masterpiece replete with realistic floral, fauna, and even morning fog. Fire up *Tiger Woods* on a cold, gloomy winter's day, and you'll feel like it's spring again.

Props go to the realistic physics engine. Once you figure out which clubs and swings do what, you'll be able to finesse your shots with precision. The prospect of making a perfectly placed shot encourages risk-taking, which in turn leads to moments of high drama: For every intentionally faded hook shot that lands just perfectly, you'll inevitably hit a few balls into the rough. And that's what golf is all about. Or so we're told; we're just PC dudes. There's really nothing wrong with this game, save for a few bugs, slow group play that will have you constantly hitting the Esc key, and the ugly dumpiness of all the AI players. Every time we entered Joline in a tournament, it looked like a group date from "Average Joe."

—JON PHILLIPS

MAXIMUM PC VERDICT 9

+ HAPPY GILMORE

The best of its genre—ever. Career mode play offers best replay value of any golf game—ever.

– SHOOTER MCGAVIN

Ugly NPCs, slow tournament play, and a bug that denies use of the putter.

$40, www.easports.com

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Max Payne 2: The Fall of Max Payne

The gaming equivalent of a fantastic one-nighter

The gritty, pill-popping New York cop is back, and man is he pissed. Tragically, Max Payne still hasn't moved past that nasty drug dependency or the brutal murder of his entire family, which makes him sort of a cross between Rush Limbaugh and Kaizer Soze.

Mental anguish notwithstanding, Max's second outing improves on the first go-round in virtually every category, though it's by no means free of shortcomings.

The most notable improvement is the presence of the Havok 2.0 physics engine, which endows objects with realistic mass, allowing them to react to physical forces much like they would in the real world. Shoot someone in the shoulder, for example, and his arm and torso fling backwards. Similarly, objects like wood boxes and metal ramps–all conveniently placed for maximum destruction–splinter or spark when caught in the crossfire. These effects make for some neat eye candy, but are certainly not a necessary element of the game.

The bullet-time mode that wowed us in the original game has been tweaked in the sequel so that action can be made even slower. And frankly, it strikes us as a step backward. In the original, everyone slowed to the same speed in bullet time; in *Max Payne 2*, Max and his enemies move on different time scales. The result feels too easy; you run into a room, trigger bullet time, and begin mowing down enemies, all of whom appear to be trapped in tar while Max dances around blasting them in the face. Compounding this flaw, the more Max kills, the slower his enemies move, while he maintains full-speed at all times.

***Max Payne 2* improves on the action-movie formula in almost every way, but its bread and butter is still the bullet-time shootouts.**

The Max-FX graphics engine looks brilliant in its second iteration, even though it uses just a few shaders here and there. As in the first title, every texture and model in the game is based on actual photography and looks as realistic as any we've seen. In fact, we really can't say enough about the level of realism in the game's environment, but maybe we're just hyper-sensitive to this issue after braving the barren hallways of *Halo*.

Max's dream sequences have also improved significantly. In the original, Max sprinted through mazes and completed annoying jumping puzzles in a wobbly dream state that felt like a drunken obstacle course. Gamers hated these levels, so Remedy, um, remedied the situation by making the sequences purely story-based and, thankfully, utterly devoid of puzzles. These sequences are also shorter and completely linear, which makes them occasionally tolerable.

One thing that isn't tolerable, however, is the fact that you are forced to play the game the first time through on the easiest skill setting. Combined with the unfair advantage that the new bullet time affords, this wussified difficulty level allowed us to breeze through *Max Payne 2* in just eight hours, after which we felt kind of empty. (It might interest casual gamers to know that *Max Payne 2* will also "intelligently" adjust itself to a player's skill level, e.g., providing more health packs to someone who gets killed often.) Completing the first level unlocks the next couple of difficulty levels, but playing essentially the exact same game all over again held little appeal for us. There's no multiplayer, but a new game mode called Dead Man Walking pits you against constantly respawning bad guys in a series of small enclosed maps and provides a fun way to practice against the game's AI opponents. Still, it's no substitute for Deathmatch.

Gamers daunted by the commitment of a 30-plus hour gaming experience will love *Max Payne 2's* brevity. We certainly found the game to be a fun romp—there's no denying that the action kicks ass—but the abbreviated length, modest difficulty, and lack of multiplayer ultimately convinced us that *Max Payne 2* simply doesn't deliver enough gut-spilling content for the money.

—JOSH NOREM

Thanks to the Havok physics engine, Max can now begin building an elevator made of humans. Here we see him moving the foundation bodies into place.

MAXIMUM PC VERDICT 8

BULLETS

Better graphics, fewer puzzles, same "Hollywood" feel.

MULLETS

Too easy, little to no replayability.

$50, www.rockstargames.com

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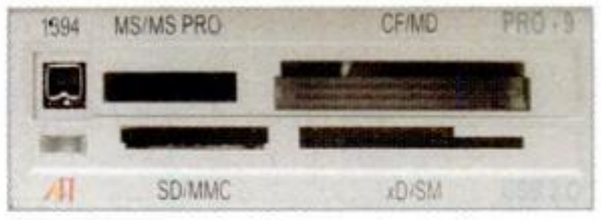

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Call of Duty

Set your sights on the best WWII shooter yet

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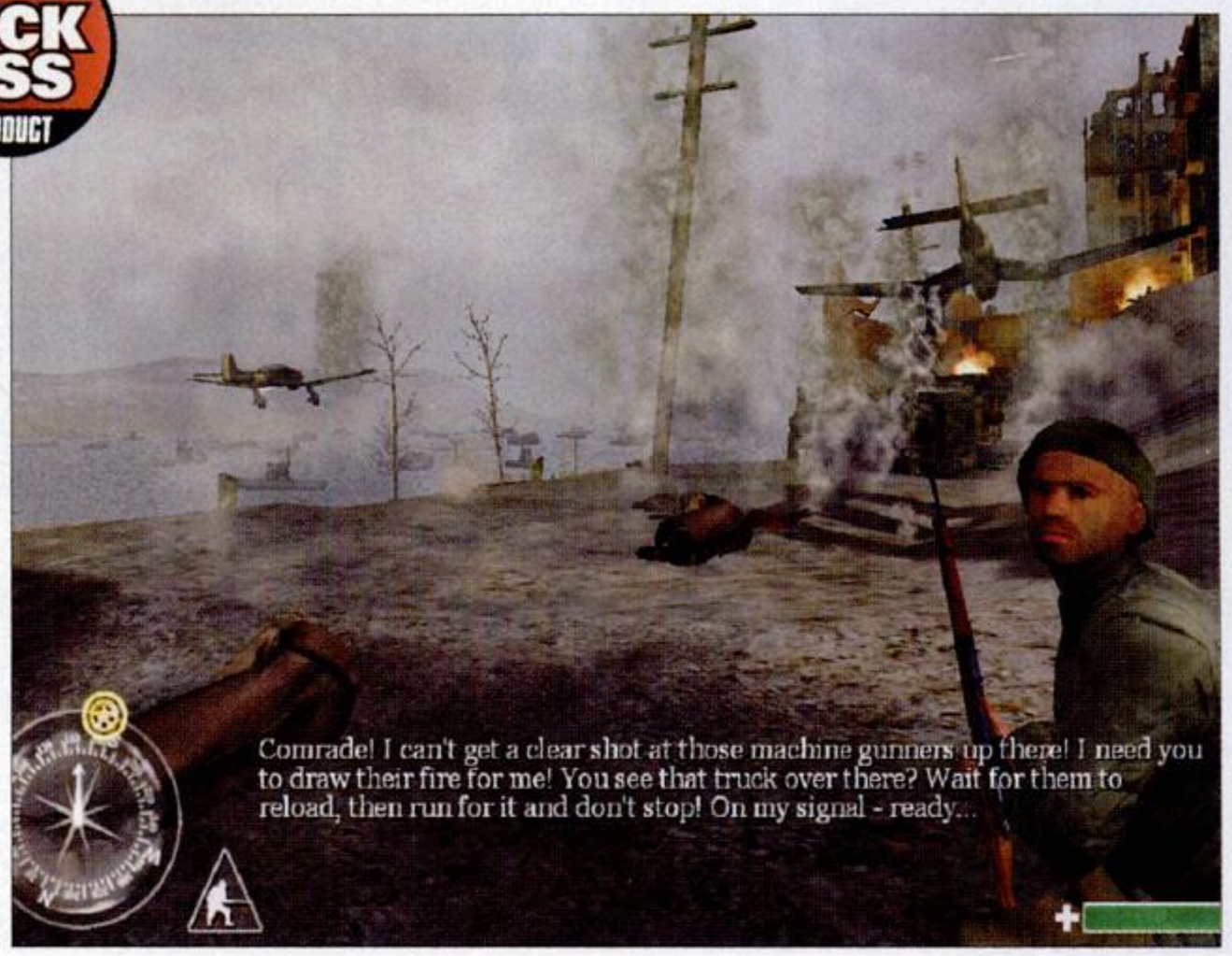
Comrade! I can't get a clear shot at those machine gunners up there! I need you to draw their fire for me! You see that truck over there? Wait for them to reload, then run for it and don't stop! On my signal - ready...

During your valiant charge up the banks of the Volka to Stalingrad, you'll be dive-bombed by Stukas, shot at with machine guns, and even treated to some artillery love, all without the benefit of your own weapon.

Listen up, soldiers! We know you've spent hundreds of hours playing World War II first-person shooters. We know you're sick to death of them. You've played the heck out of *Medal of Honor, Battlefield: 1942,* and *Operation: Flashpoint,* and you probably feel like combat-hardened veterans, don't you? Wrong! You're still just whining babies! Until you've played *Call of Duty,* that is.

Call of Duty is the ultimate WWII-themed first-person shooter. It excels in the genre by teaming you with fellow compatriots in almost every mission of the game's three drastically different settings. We're talking about squad mates that behave intelligently, using cover and grenades to their advantage, laying down suppressing fire to pin an enemy, and—*get this*—actually killing enemies without your assistance. Furthermore, your squad mates' behavior isn't strictly scripted. Each time you replay a mission, your cohorts will respond differently, making for a highly dynamic, realistic experience.

Multiplayer is exquisite, the weapons are powerful and perfectly balanced. To succeed, you must use available cover, teamwork, and guile.

Just because your squad mates' actions aren't scripted doesn't mean that *Call of Duty* is a complete crap-shoot. Quite the contrary, in fact. Intelligent use of scripted events throughout the game convincingly draws you into the story while creating the illusion of intense activity outside your immediate vicinity. The first Russian mission epitomizes this approach: Immediately after climbing out of a transport, you'll be shell-shocked by a cavalcade of dive-bombing stukas, handed ammunition but no weapon, and forced into a kamikaze charge up a hill loaded with German machine gun nests.

As you progress through the single-player campaign, you'll play as an American G.I., an elite British Airborne unit, and a wet-behind-the-ears Russian conscript. Playing the three campaigns as three completely different soldiers drives home *Call of Duty's* sobering, central theme: No one man can turn the tide of war alone.

The game simply oozes with attention to detail. Infinity Ward, the developer, has made most of the load screens serve as mission briefs, complete with tips disguised as notes from your commander that will significantly help you in your next mission. The game's frequent auto-saves—you'll never have to replay more than 10 minutes of the game should you die without saving—are descriptively named based on your current objective. And finally, aiming down the sight of your weapon, known as iron sights, is brilliantly executed here. The feature will not only increase your zoom level, but also make your shots more accurate and decrease recoil on most of the weapons.

Call of Duty does have its share of shortcomings. The game's intelligent path-finding and goal-based AI allows each German soldier to decide where he'll dig in, creating slightly different enemy placement each time. But the feature isn't utilized in every level. Sometimes the enemies are in different places, and sometimes they're not, an inconsistency that messed with our suspension of disbelief. The grenades were another disappointment. Pulling the pin and counting to three before you toss a pineapple is a time-tested technique for tagging Gerry. In *Call of Duty,* however, each grenade is armed the moment it leaves your hand, not when you first pull the trigger. While this may save you from falling on your own 'nade, it also gives the enemy ample time to scurry from every grenade you lob.

Multiplayer won't appeal to everyone, but the tight controls, multitude of game modes, and well-structured maps will have gamers from the *Counter-Strike* set hootin' and hollerin'. Don't expect any of the vehicular bells and whistles from *Battlefield;* you won't find them here. But you will find well-balanced and powerful weapons that force players to fight as a team... if you want to survive, that is.

If you're a shooter aficionado, you must play *Call of Duty.* It's one of the best shooters we've ever played.

—WILL SMITH

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One of the latest, *PC Magazine* Editor's Choice Award in October 2003, praised Velocity Micro's Raptor 64. "Not only is the Velocity Micro Raptor 64 the lowest-priced Athlon 64 FX box in our round-up ($3,658 direct), in terms of features and performance you don't really sacrifice much over the other systems [Falcon Northwest & Voodoo]. For that combination, it gets our nod as Editor's Choice."

Upon closer examination, it's easy to see why Velocity Micro is one of the most respected companies that are out there in the marketplace. The group is passionate about combining performance with power. And with their commitment to customer service, Velocity Micro stands behind every machine they build.

One of the keys to Velocity Micro's success is the components they choose. While there are tons of choices out there, Velocity takes the time to find the best pieces that give the most performance at the right price. Consider the praise from *Computer Shopper* in August 2003, "Reasonably priced, the Vector VX is well-configured with excellent components. Its fast CPU, integrated multichannel sound, big hard drive, and top-notch graphics add up to impressive performance to please the gaming, home, and small-office crowds."

But the beauty of Velocity Micro's computers doesn't stop there. These guys really know speed. Each machine has enough zip to satisfy the most serious gamer, the most demanding business owner or the most geeky tech-head. "The Vector VX is a testament to Velocity Micro's ability to put together a quality rig; this machine is not only the fastest of the three tested, it's also the most stable," said *Computer Gaming World* in their Editor's Choice of June 2003.

In short, Velocity packs power with performance in each and every one of their computers. If you're looking for the best, consider Velocity Micro, an award-winning name with a dynamite price and solid customer service. ■

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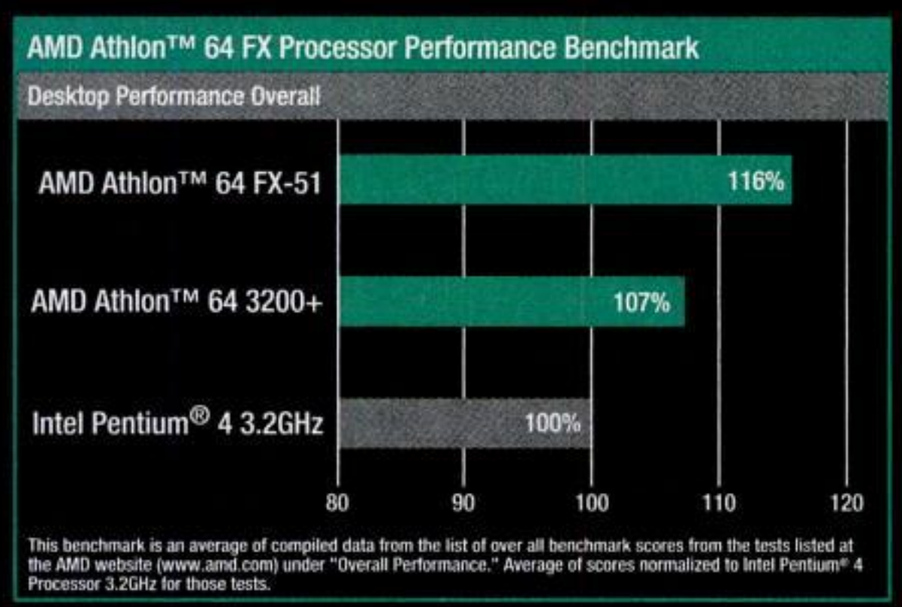

This benchmark is an average of compiled data from the list of over all benchmark scores from the tests listed at the AMD website (www.amd.com) under "Overall Performance." Average of scores normalized to Intel Pentium® 4 Processor 3.2GHz for those tests.

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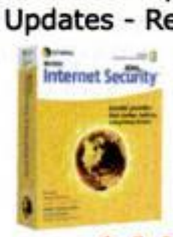
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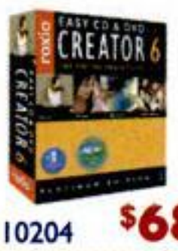
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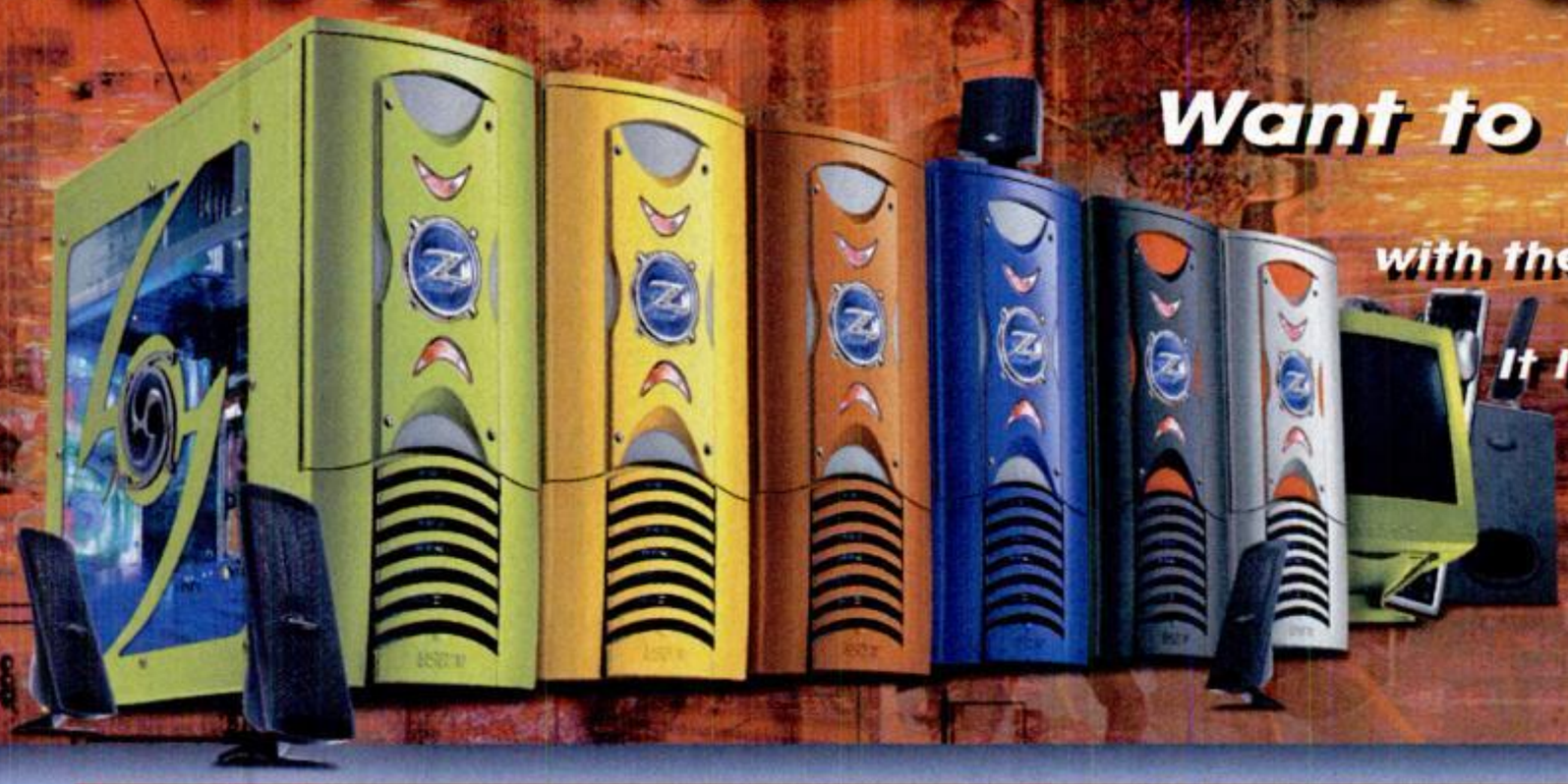

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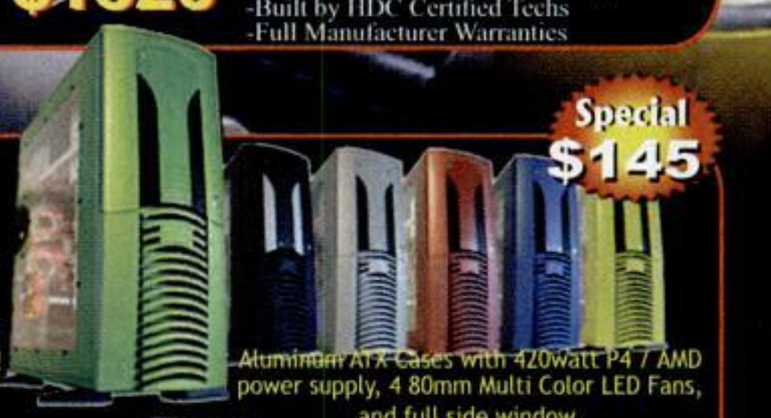

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Intel	D875PBZLK	$174	D865GLCLK	$137
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MSI	MS6585F020	$72	MS6758010	$140
	MS6758020	$192	865PNEO	$89
Asus	A7N8XX	$88	A7V8XX	$70
	A7S333PA	$65	A7V8XLWFSR	$116
	A7V8XLAN	$94	A7N8X Deluxe	$135
Gigabyte	GA7VKMP	$68	GA7N400PRO	$126
	GA7ZXE	$59	GA7VT600L	$77
MSI	K7N2DILSR	$136	6561010	$50
	6570020	$90	MS6570010	$93

Processors Step 3

Celeron	2.2 GHz 128 cache	$82	P4	2.4GHz 512k 800	$202
Celeron	2.4 GHz 128 cache	$93	P4	2.66GHz 512k 533	$185
Celeron	2.5 GHz 128 cache	$98	P4	2.6GHz 512k 800	$206
Celeron	2.6 GHz 128 cache	$103	P4	2.8GHz 512k 533	$289
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Xeon	2.66GHz 512 cache	$304	P4	3.06GHz 512k 533	$436
Xeon	2.8GHz 512 cache	$370	P4	3.0GHz 512k 800	$318
Xeon	3.06GHz 512 cache	$520	P4	3.2GHz 512k 800	$456
P4	2.4GHz 512k 533	$185			
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XP	2700+ Retail 333Mhz	$152	Athlon64	3200+ 1600Mhz	$476
XP	2800+ Retail 333Mhz	$197			

Memory Step 4

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Branded	PC133	512MB	64x64 133MHz	$59

DDR Memory

Crucial	PC2100	128MB	DDR 266MHz	$31
Crucial	PC2100	256MB	DDR 266MHz	$52
Crucial	PC2100	512MB	DDR 266MHz	$92
Crucial	PC2700	128MB	DDR 333MHz	$39
Crucial	PC2700	256MB	DDR 333MHz	$57
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Maxtor	160GB	7200rpm	ATA 133	6Y160P0	$160
Maxtor	200GB	7200rpm	SATA	6Y200MO	$212
Maxtor	160GB	7200rpm	SATA	6Y160MO	$171
Maxtor	250GB	5400rpm	ATA 133	4A250JO	$267
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Seagate	80GB	7200rpm	SATA	ST380013AS	$96
Seagate	120GB	7200rpm	SATA	ST3120026AS	$125
Seagate	160GB	7200rpm	SATA	ST3160023AS	$162
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WD	120GB	7200rpm	ATA100	WD1200BB	$107
WD	120GB	7200rpm	ATA100	WD1200JB	$115
WD	200GB	7200rpm	ATA100	WD2000JB	$199
WD	250GB	7200rpm	ATA100	WD2500JB	$277

Video Cards Step 6

EVGA	256A8N328AX	GEFORCE FX 5900 256MB DDR VO/DVI	$457
EVGA	256A8N318TX	GEFORCE FX 5600 256MB DDR VIVO/DVI	$184
EVGA	128A8N306L6	GEFORCE FX 5200 128MB DDR VO/DVI	$85
EVGA	256A8N333AX	GEFORCE FX 5950 256 MB DDR VIVO	$457
Asus	V9520	V9520 Video Suite 120Mb	$117
Asus	V9950TD	GEFORCE FX 5900 128MB VIVO/DVI	$331
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MSI	FX5900TD128	GEFORCE4 FX5900 128MB DDR DTV/DVI	$295
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ATI	100437004	Radeon 9600 Pro 128MB DDR VI/DVI	$156
ATI	100435002	Radeon 9800 Pro 128MB DDR 8x AGP	$394
ATI	100713100	Radeon AIW Radeon 9800Pro 128MB DDR	$408
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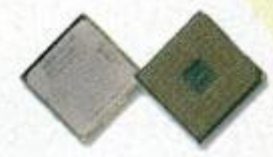

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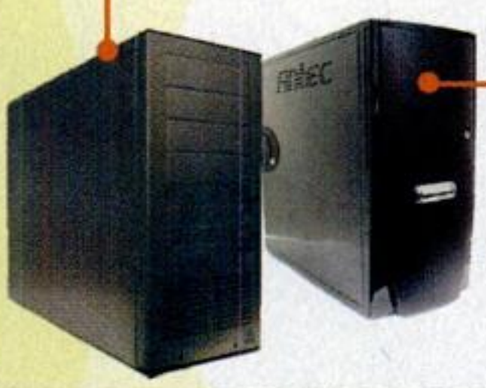

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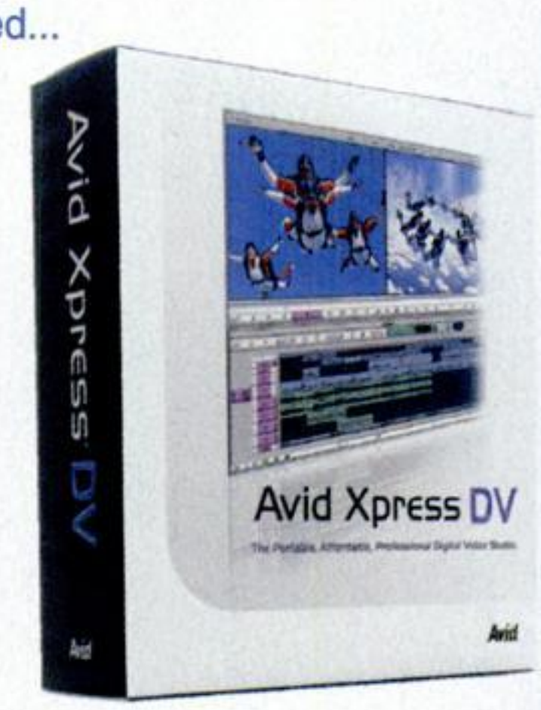

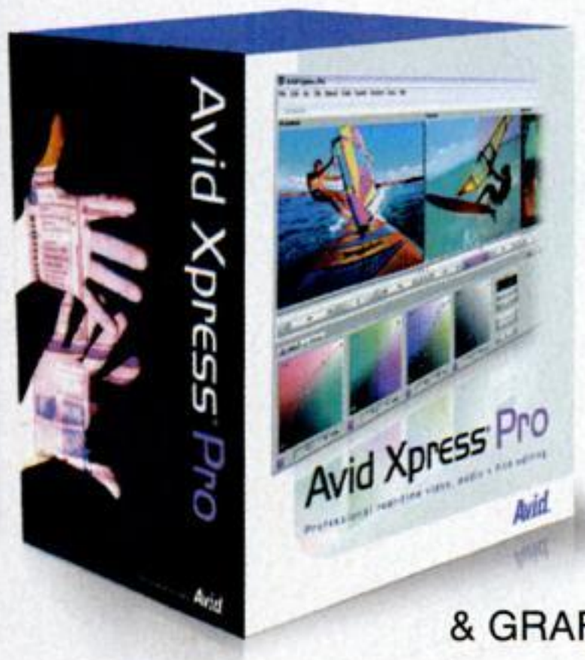

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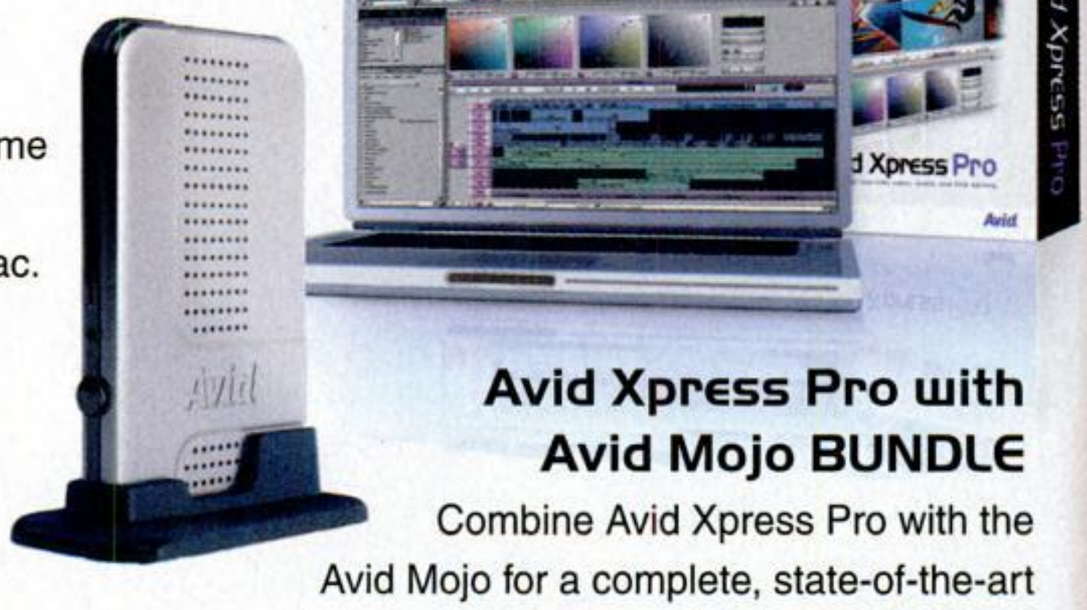

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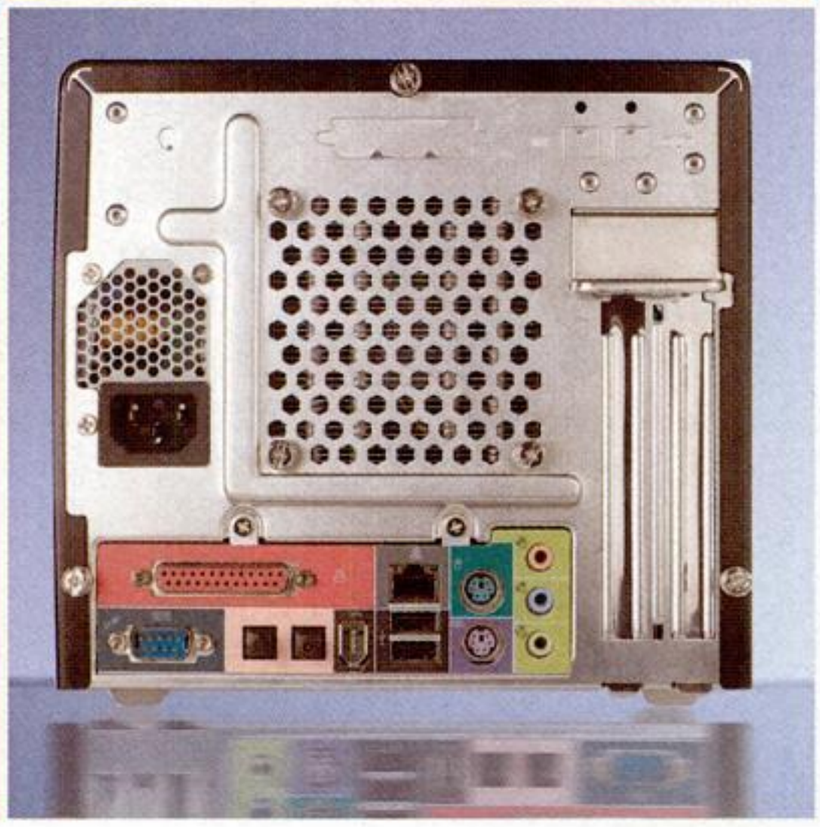

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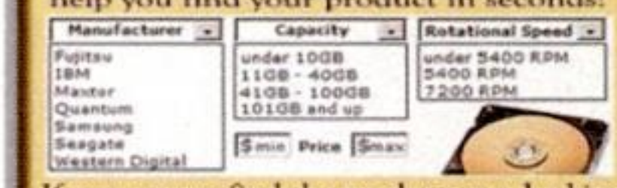

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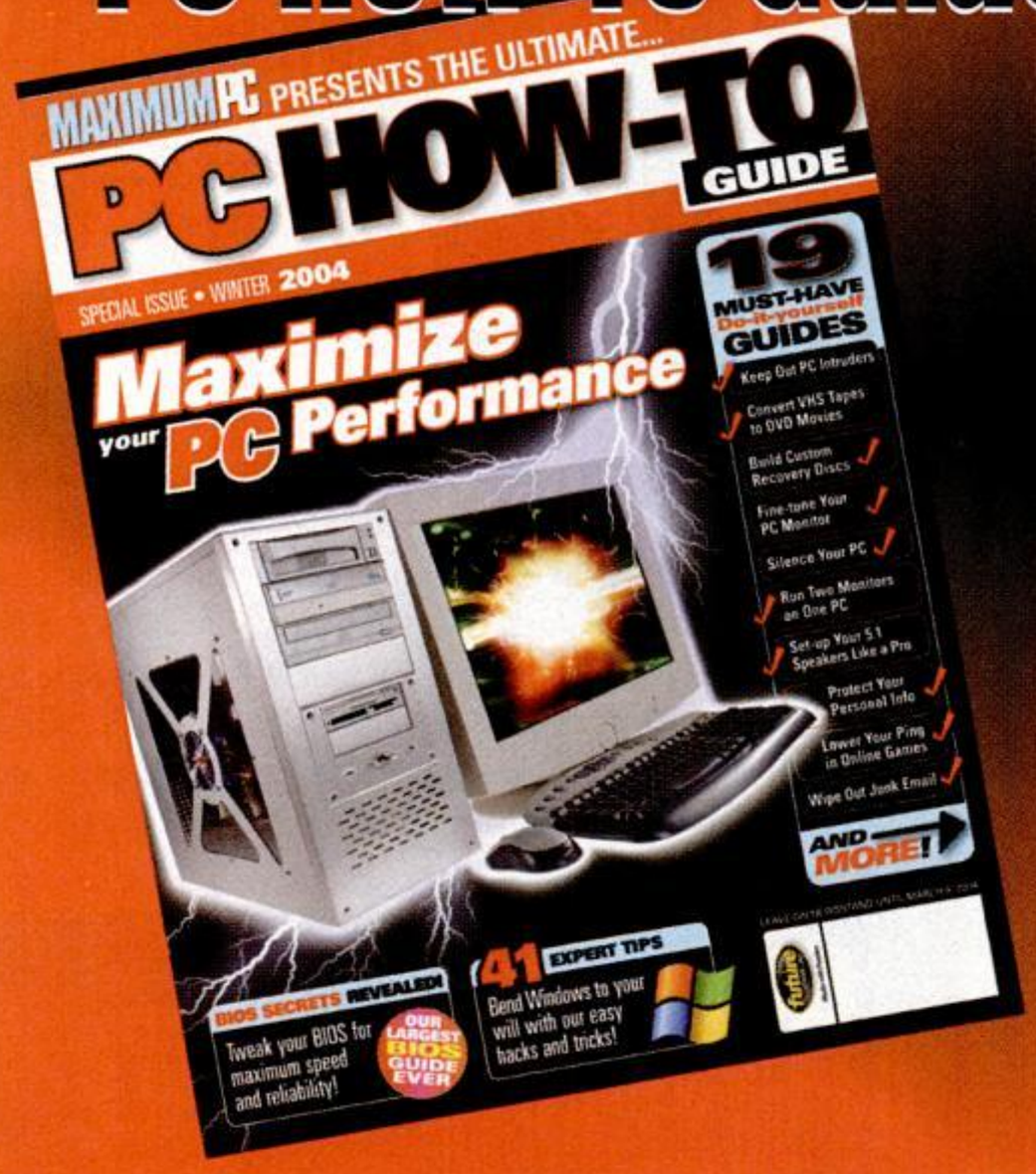
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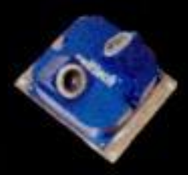
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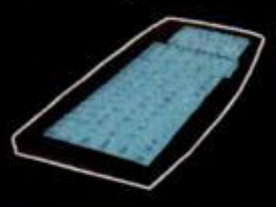
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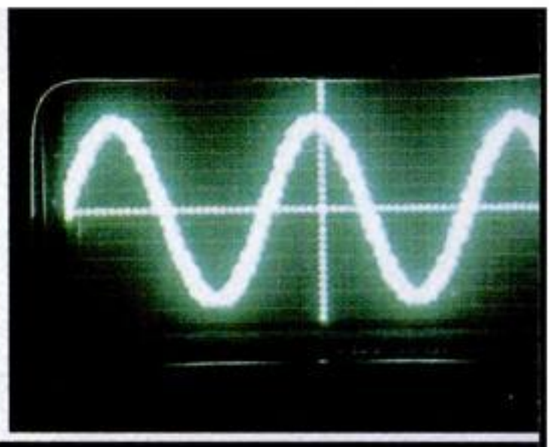


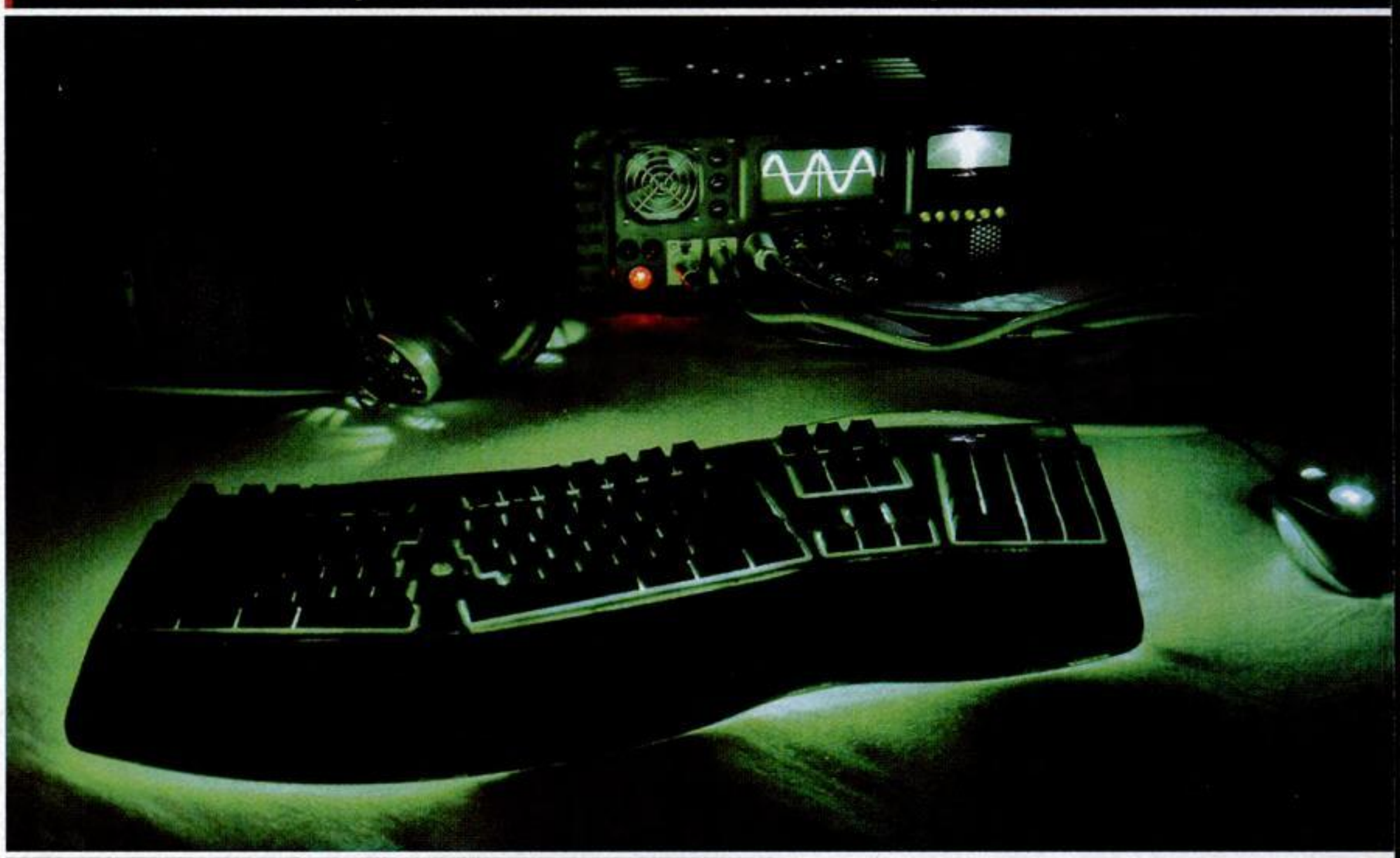
THIS MONTH: Zap Wizard's Radioactive Computer

We can only imagine what other gamers must think when Joshua Driggs (aka ZapWizard) enters a LAN party. Surely they notice his crush-proof plastic ammo case the moment he walks in carrying it by its sturdy handle. When he hoists the 36-pound beast atop an available surface, flips open the door at one end, and starts plugging in cables and punching buttons, prompting lights to flash and a sine wave to dance across the center display, it's gotta raise eyebrows.

"Is this guy about to kick our butts in *Counter-Strike* or blow the place to bits?!," onlookers must wonder.

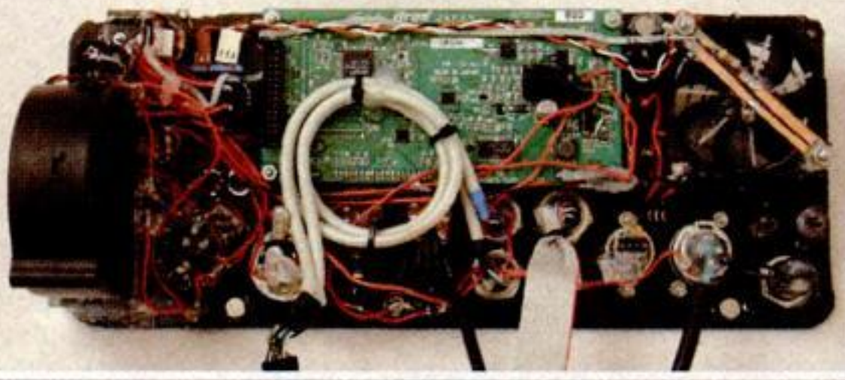
We can't vouch for Driggs' gaming skills, but we too are in awe of his armament's verisimilitude.

The front-panel's aesthetic is taken from old military radios. The multi-pin connectors were all custom-made by Driggs himself, and the vacuum florescent display is capable of running system stats, *WinAmp* visuals, Divx movies, or the sine wave pictured here, which Driggs created in *trueSpace.* Speaking of *trueSpace,* it was with the help of this free rendering app, that Driggs was able to perfectly map out every element of the front panel and plot the precise placement of all the components that would live in the 12x11.75x4.75-inch box.

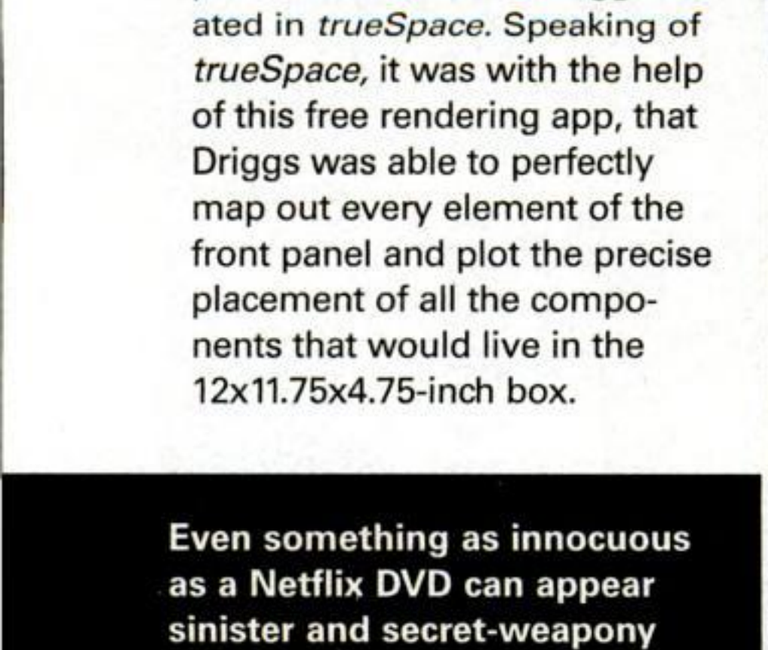


Is it any surprise that Driggs has been fooling around with electronics since the tender age of 9?

Below you see behind the scenes of the impeccable front panel. For details on the project check out www.zapwizard.com.



Even something as innocuous as a Netflix DVD can appear sinister and secret-weapony when ejecting from a hidden drive tray at the ammo box's southern end.



What's that, you ask? Just your average set of quadraphonic headphones. Driggs modified them himself, equipping each side with two speakers. Like the mouse and keyboard, the phones emanate the green glow of active cold-cathodes.

"One thing I did not want to sacrifice in this project is speed," says Driggs, "so inside I managed to pack an AMD Athlon XP 2700+, Corsair XMS memory, a Leadtek nForce2 microATX motherboard, an ATI Radeon 9200 videocard, a full-size Western Digital hard drive, a laptop style DVD drive, and nine fans."

For his winning entry Joshua Driggs wins $1,000 and a case of BAWLS to fuel his late nights of modding. You can win too! See page 86 for contest details.

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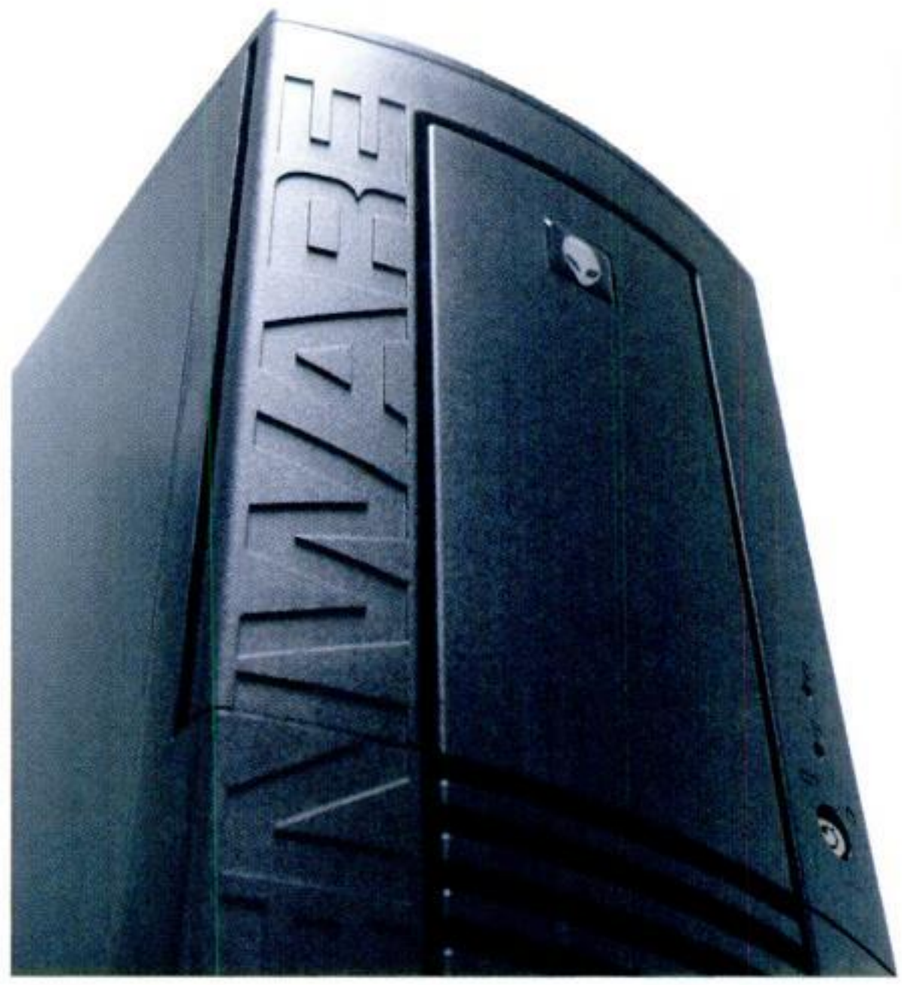

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